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Grünzel (H.). **Untersuchungen über die Oosporenbildung beim falschen Mehltau der Weinrebe (Peronospora viticola de Bary).** [Studies on oospore formation by downy mildew of Vines (*Plasmopara viticola*).]—*Z. PflKrankh.*, **68**, 2, pp. 65–80, 8 fig., 1961. [Engl. summ. 70 ref.]

Naturally infected vine leaves from various localities and leaves from healthy vines which had been inoculated with spore suspensions of *P. viticola* [**40**, 263] and enclosed in bags during growth in the greenhouse were examined at the Inst. für Obstzüchtung, Naumburg/S., Germany. Oospore formation depended on leaf age and maturity and on resistance of the *Vitis* sp. or vine var. Those on which sporangial formation was inhibited contained many oospores. The numbers increased in senescent leaves due to the physiologic inhibition of fungus growth. Climatic factors had no effect. Among populations of *P. viticola* from the most important German vineyard districts oospore production varied under similar growth conditions. No oospores were formed on leaves infected with single-sporangium cultures.

Ptitsyna (Mme N. V.) & Durdina (Mme O. A.). Паста нафтената меди — заменитель бордосской жидкости. [Copper naphthenate paste—a substitute for Bordeaux mixture.]

Zaĭtsev (O. F.). Опыт применения нафтената меди на виноградниках против мильдью [Experiment with application in vineyards of copper naphthenate against mildew.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 3, pp. 36–38; 38–39, 1961.

The preparation of 100 l. of this fungicide [cf. **38**, 649], as devised by the Inst. Mineral Resources, Ukrainian Acad. Sci., and assayed on some collective farms, consisted in mixing 79 l. clay suspension (bentonite clay+water at 1:2 or other loamy clay+water at 1:1) with 15 l. soap-naphtha (a brown waste product obtained in processing naphtha; sp. gr. 1·02) and 6 l. 20% $CuSO_4$. Sprays of 4–10% conc. reduced mildew [*Plasmopara viticola*: **40**, 328] by about a half, i.e. were approximately as effective as 1% Bordeaux mixture, and cheaper.

The 2nd paper gives a slightly different recipe (20–25 kg. clay+64–69 l. water+6 kg. soap-naphtha+5 l. 20% $CuSO_4$, sprayed as 1:10–1:12 suspension) and notes the results obtained by various users. The necessity of using the ingredients in proper dosages to ensure effectiveness and avoid burns is emphasized. The advantages included 60% adherence after rainfall, as compared with almost nil [?] for Bordeaux mixture, and 2–2·5 times lesser cost of production.

Kostyuk (P. N.) & Shterenberg (P. M.). Корневые эндофитные грибы Виноградной лозы. [Root endophytic fungi of the Vine.]—Труд. всес. н.-и. Инст. Винодел. Виноград. Магарач. [*Trud. vses. n.-i. Inst. Vinodel. Vinograd. Magarach.*], **6**, 1, pp. 173–180, 1959. [Abs. in *Referat. Zh. Biol., 1961*, 7, Sect. V, p. 12, 1961.]

Study of the endotrophic phycomycete mycorrhiza of vine showed profuse interweaving of hyphae in the intercellular spaces of the cortex of the absorptive roots, similar to that with ecto-endotrophic mycorrhiza. Mycelium penetrates the intercellular spaces and the cells of the epidermis and the pericycle, forming vesicles. Mycelium and vesicles often surround the central vascular cylinder with a dense covering. In some cells the mycelium forms pelotons, though this is not an

indication of parasitism. Intensive root infection by an endogenous fungus is almost always reflected in excessive development of the plant, and intense green coloration.

Annual Report, East Malling Research Station, 1960 (1st Oct. 1959–30th Sept. 1960). —xxiv+148 pp., 14 fig., 2 diag., 17 graphs, 3 maps, 1961.

Some of the information in this report [cf. **39**, 650] has been noticed. In the plant path. sect. (pp. 24–30) it is stated that freshly made Bordeaux mixture gives better control of bacterial canker (*Pseudomonas mors-prunorum*) [**38**, 611] on cherry than Cu oxychloride diluted to a lower Cu content to lessen spray damage risks; counts of *P. mors-prunorum* on the leaf surfaces confirmed the superiority of Bordeaux as a bactericide. Trees sprayed for several years with streptomycin have so far provided no evidence that resistance to streptomycin develops in the field. An investigation of the disease cycle on plum showed that bark tissues were most susceptible in Nov.–Jan. and the longest cankers resulted from Dec. inoculations. Bacteriophages have now been successfully stored over chloroform at 0° C. for 20 months without loss of titre. A further 30 bacteriophages active against *P. mors-prunorum* and *P. syringae* [cf. **39**, 765] have been isolated; 45 are now available. Phages for *P. viridilivida*, *P. angulata*, and *P. pisi* have also been isolated from soils and farmyard manure.

Of several fungicides tested against perithecia and ascospore production in *Venturia inaequalis* and *V. pirina*, only 0·1% phenyl mercury chloride completely suppressed spore production. Further work in the glasshouse on the infection requirements of *V. inaequalis* emphasized the close relationship between ascospore infection and environment. Better results followed promotion of high humidity with a falling temp. during the establishment of infection than maintenance of leaf wetness by artificial rain at opt. temp. Infection was not prevented when a dry period of several hours interrupted a period of leaf wetness.

In contrast to the 1959 results the DNOC petroleum spray against *Podosphaera leucotricha* on apple was at least as effective in the dormant period as at bud burst, which seems to indicate a seasonal influence.

Inoculation experiments have established that the bud rotting disease of hazel [*Corylus avellana*] is caused by *Gloeosporium* sp. and have clarified the disease cycle.

Further studies of the mechanism of resistance to *Verticillium* spp. in wilt-tolerant hops and other crop plants and weeds indicated that at present the character most consistently associated with high resistance is early and complete suberization of the endodermis. It appears that very high tolerance in new experimental hop vars. may be associated with an unusually early development of suberin in the endodermis of young roots. Although an intense phenolic reaction in roots (Hoepfner-Vorsatz test) is often associated with high resistance to *Verticillium*, e.g. in grasses and plantains [*Plantago*], this is not always so. The field [broad] bean gave a very strong reaction but is only moderately resistant, while some apparently very resistant crucifers give no phenolic reaction.

Fresh outbreaks of cherry leaf roll virus [**40**, 364] in Kent, Berks., and Worcs. are reported. The virus was transmitted from cherry to herbaceous hosts and from tobacco to cherry and strawberry. An antiserum to this virus has facilitated reliable diagnosis and shown that a virus associated with 'rozet' disease in the Netherlands [cf. **39**, 332] is a str. of cherry leaf roll virus. Serological tests showed that raspberry ringspot [raspberry Scottish leaf curl] virus was associated with and probably the cause of cherry rasp leaf in Kent and Berks. The unhealthy condition of many Noble orchard trees appears similar to that caused by [cherry] necrotic rusty mottle [virus: cf. **39**, 182] in N. America. The symptoms, leaf yellowing and premature defoliation, accompanied by bud death and gumming, are easily

confused with those of bacterial canker. Tradescant's Heart developed these symptoms after inoculation with the virus from Noble.

A technique for the serial transfer of nematodes (*Xiphinema diversicaudatum*) from one strawberry plant to another was developed for the study of virus transmission by this vector [cf. **39**, 427]. Arabis mosaic virus [**39**, 603] was transmitted to petunia seedlings after a min. acquisition feeding period of 1 day and a test feeding of 3 days; the nematodes remained infective for up to 30 days without access to plants. Strawberry green petal virus [cf. **39**, 604] was transmitted to white clover plants by *Speudotettix subfusculus*, the 4th genus of leafhoppers found to transmit it. Another virus, closely resembling aster yellows in its effect on *Vinca* and delphinium, was shown to affect strawberry plants severely, causing leaf reddening and wilt.

In a trial planted in 1954 the black currant yellows and vein pattern viruses [**33**, 97] decreased the weight of the Baldwin currant crop by 70 and 34%, respectively, during 1957–60; corresponding losses for Wellington XXX were 71 and 52%. The yellows virus had an obvious stunting effect and decreased both the number and size of the fruits, whereas the less virulent vein pattern virus decreased the size of the fruits but had little effect on their number.

Among the Bulletins for Fruit Growers is one by M. H. Moore on the control of *Botrytis cinerea* on strawberry (pp. 132–133) [cf. **39**, 262] and one by R. V. Harris giving an annual summary 'Progress in research on *Verticillium* wilt and virus diseases of hops in 1960' (pp. 141–144).

Stations fédérales d'essais agricoles, Lausanne. Rapport d'activité 1959. [The Federal Agricultural Experiment Stations, Lausanne. Report of work in 1959.] —*Annu. agric. Suisse*, (**75**, éd. fr. **62**), N.S. **10**, 1, pp. 1–323, 51 fig., 15 graphs, 3 diag., 1961.

In the plant path. sect. (pp. 85–117) of this report [cf. **39**, 531], some of the information in which has been noticed, it is stated that at the end of the season beets sustained an almost generalized attack by *Erysiphe communis* [*E. polygoni*]. Collar rot (*Phytophthora cactorum*) was noted on Cox's Orange Pippin apple and on Golden Delicious grafted on Cox's Orange. Pocket plum (*Taphrina pruni*) [cf. **35**, 108] was found in several localities. Carrots were often attacked in autumn by *Erysiphe umbelliferarum* [cf. **40**, 199]. A few tulip vars. were affected by a leaf spot attributed to *Synchytrium laetum*. In a spraying test against *Septoria apii* on celery Cu oxychloride gave much better control than an organic preparation containing guanidine (70% active material).

R. Bovey & F. Pelet (pp. 211–227; Germ., Engl., Ital summ.; 64 ref.) present an annotated list of plant virus diseases in Switzerland, the name of each disease being given in French, followed by the synonyms in English, German, and Italian, and by the name of the virus as given in the supplement to this *Review* **35**. The notes cover economic importance, damage caused, symptoms, means of transmission, var. resistance, and other features. [Also as *Publ. Sta. féd. Ess. agric.* 631, 1961.]

Describing experiments from 1957–59 against *Coniella diplodiella* [**39**, 532] on vines, A. Bolay & R. Corbaz (pp. 239–248; Germ., Engl., Ital. summ.) state that captan, mesulfan, fensulfan, or phaltan gave adequate protection against infection of berries damaged by hail if applied up to 21 hr. after a storm.

Plantesygdomme i Danmark 1958. Årsoversigt samlet ved Statens plantepatologiske Forsøg, Lyngby. [Plant diseases in Denmark 1958. Annual report compiled by the State Phytopathological Experiment Station, Lyngby.]—*Tidsskr. Planteavl*, **64**, 5, pp. 737–800, 2 graphs, 1960. [Engl. summ.]

Prepared on the usual lines, this report [cf. **40**, 330] contains contributions by A. Jensen, M. H. Dahl, J. Jørgensen, H. A. Jørgensen, H. R. Kristensen, and

K. Lindhardt. Much of the information is well known and some has already been noticed. Physiological disorders included K deficiency in barley following swedes, clover, grass, or beets, which also affected potatoes and clover, though rarely in a serious form. Mn deficiency, widespread among cereals after heavy rainfall in late May, was corrected by spraying with $MnSO_4$. The beet crop suffered less severely from the same cause. Mo deficiency in clover on ochre- and bog iron-ore soils, long deprived of stable manure in Jutland, was characterized by stunting and foliar discoloration (pallor and reddening).

Corticium solani was unusually prevalent on cereals, frequently as a result of early planting in cold soil. The sclerotia were detected on the finest roots as well as on the stems above and below the ground. Potato leaf roll virus was more serious than in previous years, probably in consequence of an abundance of highly infective aphid vectors in 1957. Outdoor tomatoes sustained heavy damage from *Phytophthora infestans*, often despite repeated spraying. *Mycosphaerella citrullina* was fairly frequent and occasionally severe on greenhouse cucumbers. Neglect of preventive spray treatment led to heavy infection by *Pseudopeziza ribis* on gooseberries and black currants. *Didymella applanata* occurred in a virulent form on raspberries, partly due to the insufficient protection afforded by sprays and partly to the superabundance of new growth. Extensive defoliation of poplars was caused by *Venturia* [*Pollaccia*] *radiosa* [*V. tremulae*: cf. **39**, 444] alone or with *Melampsora* spp.

The following are new records for Denmark: apple die-back in which the development of small, necrotic, horseshoe-shaped wounds under or round the buds, was combined with delayed and reduced general growth and flowering. The most susceptible var. seems to be Cox's Orange Pippin, but Golden Delicious and Ingrid Marie are also affected. A faint green mosaic, unlike but probably related to apple mosaic virus, observed on Golden Delicious. Sour cherries producing abnormal fruits believed to be affected by little cherry virus. Yellow-green, ring-shaped spots on elderberry (*Sambucus nigra*) attributed to a mosaic virus [cf. **35**, 611].

A severe, yellow-green mosaic of *Alliaria officinalis* leaves [cf. **39**, 161] transmitted by mechanical sap inoculation to *Tetragonia expansa*. *Gomphrena globosa*, *Chenopodium amaranticolor*, *Nicotiana glutinosa*, and White Burley tobacco were also successfully inoculated, the last-named and 1 plant of *N. glutinosa* reacting by extensive mottling and the remainder by the formation of local lesions. Veinbanding and yellows of *Aconitum fisherii* foliage was similarly transmitted to *T. expansa*. Cucumber plants inoculated with sap from *Lobelia cardinalis* showing a white, chlorotic pattern on the leaves developed vein-clearing, tobacco faint, chlorotic spots, and *G. globosa* chlorotic mottling. Sap from *Pyrethrum* sp. with yellow chlorosis of the leaves produced yellow spots on cucumber, *T. expansa*, and tobacco, with foliar mottling as well in the last-named. *Phytophthora cactorum* on pears hanging near the soil. Endive seeds imported from Italy were contaminated by *Alternaria cichorii*. Dark brown, oblong lesions produced by *Phyllostica trollii* on *Trollius europaeus* leaves during the late summer. *Nectria bulbicola* in its conidial state *Verticillium tubercularioides* caused heavy damage to pseudo-bulbs of *Calanthe harrisii* in an orchid hothouse.

Masurat (G.) & Stephan (S.). **Das Auftreten der wichtigsten Krankheiten und Schädlinge der landwirtschaftlichen und gärtnerischen Kulturpflanzen in den Jahren 1958 und 1959 im Bereich der Deutschen Demokratischen Republik.** [The occurrence of the most important diseases and pests of crop and garden plants in 1958 and 1959 in the German Democratic Republic.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F. **14**, 8, pp. 141–178, 24 graphs, 55 maps, 1960. [22 ref.]

In 1959 unusually heavy attacks on barley by *Helminthosporium gramineum* were

reported from the districts Karl-Marx-Stadt, Erfurt, and Halle. In the last two the incidence of *Puccinia glumarum* [*P. striiformis*] on wheat and barley increased owing to abundant rain in Apr. and May 1959. Several areas had outbreaks of *Ustilago tritici* [*U. nuda*] on wheat and *U. nuda* on barley. Potatoes were widely infected by *Erwinia* sp. [cf. **39**, 209] in Potsdam and Karl-Marx-Stadt in 1958 and by *Streptomyces scabies* in the same districts, Gera, Leipzig, and Cottbus in 1959. Sugar beet was heavily damaged by *Pythium debaryanum*, particularly in the Cottbus area. In 1959 epidemics of *Erysiphe polygoni* on clover were reported from Karl-Marx-Stadt (ca. 45%), Leipzig and Potsdam. In many areas outbreaks of *Plasmodiophora brassicae* reduced cabbage yields considerably; important also were infection of onion by *Peronospora schleidenii* [*P. destructor*], cucumber by *E. cichoracearum*, celery by *Septoria apii*, and bean [*Phaseolus vulgaris*] by *Colletotrichum lindemuthianum*. Favoured by extreme drought *Podosphaera leucotricha* infected apples in most parts of the country, whereas severe outbreaks of *Venturia cerasi* on cherry were locally restricted.

Chumakov (A. E.). Развитие болезней полевых культур в 1960 и прогноз на 1961 г. [Development of the diseases of field crops in 1960 and forecast for 1961.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 4, pp. 48–50, 1961.

A review by All-Union Inst. Plant Prot., dealing under separate headings with cereal rusts, smuts, damping-off of winter crops, root rots of wheat, potato blight [*Phytophthora infestans*], and downy mildew of sunflower [*Plasmopara halstedii*: cf. **39**, 587]. Some information is given on the severity of attacks in particular areas and on the damage caused.

Săvulescu (T.) et al. **Starea fitosanitară în Republica Populară Romînă în anul 1957–1958.** [Phytosanitary situation in the Romanian People's Republic in 1957–8.]—*Met. Inst. Cerc. agron. Român., 1960*, 105 pp., 19 fig., 4 maps, 1960. [Separate Russ. publication with Fr. summ.]

This report is presented in the usual manner [**39**, 654]. In an epidemic of brown rust (*Puccinia triticina*) [*P. recondita*] the wheat lines Studina 4, 9, 107, 216, and 218, Arnăut de Studina, Bărăgan 198 and 2158, Cluj 53–902, Vînjuleț, Turgidum Nițescu, and I.C.A.R. 114 (no infection) were resistant. Brucker barley was not attacked by *Ustilago nuda* and *U. nigra* when other vars. were. Some double hybrid maize lines of Pioneer, Warwick, and Wisconsin, and some local vars. were resistant or very resistant to *U. zeae* [*U. maydis*].

A new virosis on lucerne is probably caused by a complex of viruses, the most important of which is lucerne mosaic virus. Sainfoin was severely attacked by *Uromyces onobrychidis* in the south.

There is no potato var. in the country immune from virus Y. Wart [*Synchytrium endobioticum*] was more widespread than ever (161 communes in 7 regions). *Sclerotium cepivorum* was severe on onions [map 331]. In a collection of bean [*Phaseolus vulgaris*] vars. and lines none was resistant to *Xanthomonas phaseoli* or *Pseudomonas phaseolicola*; I.C.A.R. 334, Grasă urcătocare, and Galbenă untoasă were least attacked by *Colletotrichum lindemuthianum*. The melon vars. Turkestan, Olivier d'hiver, and Bycovski were least attacked by *C. oligochaetum* when others were severely damaged.

Walnuts, particularly in nurseries, were attacked by *Xanthomonas juglandis* [map 133]. New to Romania was *Coccomyces* [*Higginsia*] *hiemalis* [map 58] on cherry. *Xanthomonas pruni* [map 340] occurred in several localities. *Taphrina deformans*, 1st reported on apricot in 1955, has caused severe damage. *Venturia cerasi* [map 196], 1st reported in 1956, attacks morello cherry and apricot.

A list of plant diseases recorded in Tasmania.—*Res. Bull. Tasm. Dep. Agric.* 2, 37 pp., 1 map, 1959. [58 ref. Received June 1961.]

Supplement No. 1.—*Tasm. J. Agric.*, **31**, 3, pp. 357–359, 1960.

All plant diseases recorded in Tasmania to the end of 1956 are listed, with dates of 1st records, under the scientific names of the host plants. There are also a bibliography and indexes of common names of host plants, and also of fungi, bacteria, viruses, and physiological diseases, with the hosts affected.

Twenty-third Biennial Report, State Plant Board of Florida, 1958–60.—*Rep. Fla Pl. Bd* **2** (*Bull.* 14), 114 pp., 13 fig., 3 graphs, 4 maps, 1960.

Some of the information in the report of the Plant Path. Dept (pp. 77–94), under D. B. Creager [cf. **38**, 658] has been noticed. Studies by A. P. Martinez, J. H. Bolick, and H. C. Burnett include a note on the lethal yellows disease of coconut palms [**40**, 369]. A new record for the State was *Exosporium palmivorum* on *Butia* [*Cocos*] *capitata*.

In spring 1958, slash pine (*Pinus elliottii*) seedlings in nurseries showed severe wilting, turning ash-grey then reddish-brown, and only the tap-roots of the root system remained. A *Fusarium* was isolated consistently from affected plants. This root rot was controlled by using methyl bromide before planting (1 lb./100 sq. ft.).

A *Verticillium* was recovered from wilted *Buxus microphylla*, with a characteristic dark green discoloration of the vascular tissue from the root zone upwards, and branches sometimes turning bright orange, with orange-red spores on the undersides of newly fallen leaves.

The agent of bacterial bud blight of chrysanthemums proved to be a *Pseudomonas* sp. near to *P. calendulae* [cf. **40**, 150]. *Corynespora cassiicola* (*Helminthosporium vignae*) was consistently isolated from hydrangea leaf spots. *Cephalosporium* sp. was isolated from stem galls on hydrangea and reproduced the disease in preliminary inoculations. Leaf spots of the fern *Polystichum adiantiforme* were caused by *Cylindrocladium pteridis*. New rusts to Fla., collected on orchids, were *Uredo oncidii*, *Sphenospora saphena* on *Oncidium tetrapetalum*, and *S. kevorkianii* on the native *Epidendron tampense*. *Sphaceloma poinsettiae* [**39**, 79] was found to occur on wild *Euphorbia* spp. which may act as reservoirs of infection.

Fig mosaic virus was found in plants from Italy and Calif. *Cudrania tricuspidata* and 5 *Ficus* spp. were found to be susceptible, the former being the 1st susceptible host outside the genus *Ficus*.

The leafspot of sweet orange caused by *Cercospora penzigii* is becoming more common, and host range studies are in progress.

Feldman (J. M.) & Pontis (R. E.). **Enfermedades parasitárias de las plantas cultivadas, señaladas para la Provincia de Mendoza (Argentina).** [Parasitic diseases of crop plants compiled for the Province of Mendoza (Argentina).] —*Rev. argent. Agron.*, **27**, 1–2, pp. 27–50, 1960. [Engl. summ. 91 ref.]

This further list from Argentina [cf. **35**, 722, 772] has been noticed in part [**40**, 272]. It covers 205 diseases of 104 crop plants, under hosts, in alphabetic order of botanical names, followed by a parasite index.

Quarterly Report for October–December 1960 of the Plant Protection Committee for the South East Asia and Pacific Region.—13 pp., F.A.O. Publ., Bangkok, Thailand, 1961. [Cyclostyled.]

In Malaya *Phytophthora palmivora* was found on cacao at the Fed. Exp. Sta., Serdang, Selangor, as was *Elsinoe batatas* on sweet potato. A new bacterial leaf disease of rice was collected in Krian, Perak [cf. **40**, 415].

In Fiji Panama disease (*Fusarium oxysporum* f. *cubense*) [map 31] was recorded for the 1st time for many years. New records include *Uredo musae* and *Haplobasidium musae* on banana, and *Fomes noxius* [**36**, 3] from coffee roots. From India

a no. of new records include *Phoma lingam* on cabbage [map 73]; *Mycosphaerella indica* on mulberry; a chlorosis virus (transmitted by *Peregrinus maidis* and also infecting sugarcane and maize), *Helminthosporium sorghicola*, and *Ascochyta sorghina*, all on sorghum; *Glomerella cingulata* on sugarcane; and *Haplosporella aleuritis* on tung.

A list is given of 24 recent records from N. Borneo.

Duddington (C. L.). **Practical microscopy**—x+237 pp., 81 fig., London, Sir Isaac Pitman & Sons, Ltd., 1960. 30*s*. net.

This most useful work, intended for amateurs and students, presumes no previous scientific knowledge of the subject. The 1st part deals with the manipulation of the microscope and the principles on which its use is based. The 2nd (mainly biological) describes some of the techniques employed in preparing specimens for examination and includes 3 chapt. dealing, respectively, with botanical material, bacteriological methods, and zoological and histological methods. An appendix gives the composition of fixatives, stains, and reagents.

Édel'shtein (V. I.) & Tarakanov (G. I.). Тепличная культура овощей в пригородах Пекина. [Hothouse cultivation of vegetables in the suburbs of Peking.] —383 pp., numerous figs., diag., & graphs, Moscow, Sel'khozgiz, 1959. [Trsl. from Chinese.] Roubles 6.75.

'The control of pests and diseases of vegetables in the hothouse' is discussed in general terms (pp. 120–124) in the 1st part of this monograph, the 2nd part of which treats individual crops in detail, including some information on diseases i.e. of cucumber (pp. 218–223), tomato (pp. 269–275, with a table on the effect of temp. on susceptibility to *Cladosporium fulvum*), bean (pp. 332–334), and pepper (p. 343). The severity of the individual diseases is indicated, with notes on pathogens and control.

Dowson (W. J.), Graham (D. C.), & Hellmers (E.). **Naming of some strains of soft-rot coliform bacteria—a correction.**—*Ann. appl. Biol.*, **49**, 1, p. 210, 1961.

Reasons are given to indicate that the correct name for the organism considered as *Pectobacterium carotovorum* var. *chrysanthemi* in 2 recent papers by Graham and Dowson [**39**, 659], should now be named *P.c.* var. *parthenii* (Starr) comb. nov.

Fallot (J.). **Prolifération in vitro des tissus de Topinambour due à l'action de Bacillus megaterium.** [Proliferation *in vitro* of Jerusalem Artichoke tissues due to the action of *B. megaterium*.]—*C.R. Acad. Sci., Paris*, **251**, 9, pp. 1088–1090, 5 fig., 1 graph, 1960.

The author has already reported the proliferation during the winter of du Lot vine stem tissues inoculated with *B. megaterium* (*C.R. Acad. Sci., Paris*, **246**, p. 295, 1958) and he now presents observations made during 1958–60 on the same phenomenon in Jerusalem artichoke [*Helianthus tuberosus*] tubers cultured on Heller's medium. The active principles secreted by the organism are soluble in water and ether. The culture filtrates and etherified extracts acted on the tissues in the same way as the bacillus itself.

Lance (C.). **Modification de la répartition des oxydases terminales liée à la transformation tumorale induite par l'Agrobacterium tumefaciens dans les tissus végétaux.** [Modification of the distribution of the terminal oxidases associated with the tumoral transformation induced by *A. tumefaciens* in plant tissues.] —*C.R. Acad. Sci., Paris*, **252**, 14, pp. 2131–2133, 2 graphs, 1961.

The results of studies involving comparative measurements of the respiration of normal Jerusalem artichoke [*Helianthus tuberosus*] tissues and those infected by

A. tumefaciens in the presence of the inhibitors HCN, N_3Na, and CO are reported from the Faculté des Sciences, P.C.B., Paris. They demonstrated a very significant reduction or even the virtual disappearance of cytochrome-oxidase activity in the diseased material, thereby confirming the outcome of the author's previous investigations along the same lines on *Scorzonera* [*hispanica*] (*C.R. Acad. Sci., Paris*, **247**, p. 959, 1958).

Mitchell (R.) & Alexander (M.). **The mycolytic phenomenon and biological control of Fusarium in soil.**—*Nature, Lond.*, **190**, 4770, pp. 109–110, 1961.

At the Lab. Soil Microbiol., Dept Agron., Cornell Univ., Ithaca, N.Y., bacteria capable of lysing *F. oxysporum* f. *cubense* were isolated from soils artificially infested with the pathogen [cf. **40**, 318 *et passim*]. They were cultured in an inorganic medium with living or dead *F. oxysporum* f. *cubense* as the sole C source; fungus cell walls separated by KOH could be substituted for intact mycelium. These bacteria lysed growing cultures of the fungus, and were identified as *Bacillus cereus*, *B. megaterium*, and *Pseudomonas* spp. Both living and dead *F. oxysporum* were lysed by the culture filtrate from *B. cereus*. The mycolytic bacteria were all able to grow in media with chitin as the C source, but culture filtrates prepared from these media did not lyse *F. oxysporum*.

The addition of a lytic *Bacillus* str. to sterile soil containing *F. oxysporum* mycelium resulted in digestion of the fungus, but the control of pathogenic *F.* spp. was not possible in normal soil as the addition of mycolytic bacteria did not disturb the microbiological equilibrium sufficiently. The addition of chitin (200 lb./acre) to soil artificially infected with *F. solani* f. *phaseoli* and planted with kidney beans [*Phaseolus vulgaris*] reduced the disease index of root rot (0, healthy; 100, severe rotting) from 39 (untreated) to 23. In a similar experiment with *F. oxysporum* f. *conglutinans* on radish the reduction was from 47 to 10. One of the effects of chitin is to increase the actinomycete population. Determination of the amount of antifungal substances in chitin-amended soil (*Arch. Mikrobiol.*, **33**, p. 182, 1959) showed that aqueous extracts of chitin-treated soil were more fungitoxic than extracts from unamended soils.

Stapp (C.). **Bacterial plant pathogens.**—xviii+292 pp., 96 fig., 2 diag., 2 graphs, Oxford Univ. Press, 1961. 42*s*.

An English translation by A. Schoenfeld of this valuable textbook [**37**, 757].

Franz (J. M.). **Biological control of pest insects in Europe.**—*Annu. Rev. Ent.*, **6**, pp. 183–200, 1961. [229 ref.]

This study from Inst. für Biologische Schädlingsbekämpfung, Darmstadt, Germany, includes a review of literature on control by fungi (pp. 186–188).

Mankau (R.). **Antagonisms to nematode-trapping fungi in soil.**—Abs. in *Phytopathology*, **51**, 1, p. 66, 1961.

The nematode-trapping fungi *Arthrobotrys arthrobotryoides* and *Dactylaria thaumasia* were eliminated from pasteurized soil enriched with wheat germ but not from unamended soil. In Petri dish cultures, *Penicillium* spp., *Aspergillus terreus*, and *Bacillus* sp. inhibited many predacious fungi. Germination of conidia of *Arthrobotrys arthrobotryoides*, *A. dactyloides*, and *Dactylella ellipsospora* was reduced by exposure to natural field soil.

Amtliches Pflanzenschutzmittelverzeichnis und Pflanzenschutzgerätverzeichnis 1961 der Bundesanstalt für Pflanzenschutz, Wien. [Official list of plant protectives and plant protection equipment 1961 of the Federal Inst. for Plant Protection, Vienna.]—*Pflanzenarzt*, **14**, Sondernummer 1, 43 pp., 1961.

This publication follows the usual lines [cf. **40**, 17].

Richtlinien für die Pflanzenschutzarbeit 1961. [Instructions for plant protection work in 1961.]—*Pflanzenarzt*, **14**, Sondernummer 2, 26 pp., 1961.

Further recommendations for work in Austria, with new sections on the protection of fodders and tobacco [cf. **40**, 17].

Beran (F.). **Neuregelung der Wartefristen für die Anwendung chemischer Pflanzenschutzmittel in Österreich.** [New regulation of waiting periods for the use of chemical plant protectants in Austria.]—*Pflanzenarzt*, **13** [**14**], Sondernummer 3, 4 pp., 1961.

These amendments [**28**, 144] lay down the periods that should elapse between last application of a protectant and harvest if the treated plants are for food or fodder. They are shown in 2 tables, one arranged by length of period, the other alphabetically by chemical names.

Schmidt (Trude). **Bodenentseuchung — auf physikalischem oder chemischem Weg?** [Soil disinfection—by physical or chemical means?]—*Pflanzenarzt*, **14**, 5, 3 fig., 1961.

In tests of volatile soil disinfectants in comparison with soil steaming at the Bundesanstalt für Pflanzenschutz, Vienna, trapex gave good results against [unspecified] fungi causing emergence diseases of tobacco.

Koopmans (M. J.). **Systemic fungicidal action of some 5-amino,1 bis (dimethylamido) phosphoryl triazoles 1,2,4.**—*Meded. LandbHogesch. Gent*, **25**, 3–4, pp. 1221–1226, 4 graphs, 1960.

Further studies at the Agrobiol. Lab. 'Boekesteyn', Netherlands [cf. **40**, 277], are briefly outlined, describing 2 compounds of this type, WP 137 and WP 155 (marketed under the name wepsyn), effective against *Erysiphe graminis* on barley seedlings and *Podosphaera leucotricha* on apple and protective when applied by the roots.

Kirby (A. H. M.) & Frick (E. L.). **A glasshouse method for studying the effects of chemicals on the incidence of powdery mildews.**—*Meded. LandbHogesch. Gent*, **35**, 3–4, pp. 1215–1220, 1960.

Some of this information from East Malling Res. Sta. has been reported in brief [**40**, 71]. The tower used for apple and *Podosphaera leucotricha* was circular, made of hardboard braced by Dexion steel angles, and 5 ft. high, 5 ft. diam. on a 2 ft. high base. Spores are introduced on infected shoots into a central pipe through a porthole below the tower and blown to the top by an axial-flow fan for 10–15 sec., several shoots being needed to give adequate inoculum. Later Plumage Archer barley was used as host, because it needs only 2 in. pots, and a tower 2½ ft. diam. made of large cardboard tubing, into which spores can be blown with hand-bellows. The spores of *Erysiphe graminis* are not sticky and can therefore be collected and weighed, and the inoculum standardized; the disease develops in 7 days compared to 9 for apple.

Inoculation of apple stocks after 24 hr. in the tower and leaving the plants there for another 24 hr. proved the best procedure. The number of lesions/leaf decreases sharply down the shoot, leaf 4 being fully expanded at inoculation. High temps. are adverse to sporulation and infection, exposure to 37° C. immediately on removal from the tower reducing infection by 50%. Plants should be kept at about 25° by day; R.H. need not exceed 75% at any stage during infection and disease development under glass. The chemical aspects of the results obtained with a number of compounds are discussed. It is considered that the anti-mildew properties of karathane are largely due to the phenolic components.

Snegovskiĭ (I. F.). Машины для защиты растений. [Appliances for plant protection.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 4, pp. 41–46, 12 fig., 1961.

A review of 25 spraying, dusting, and steeping machines, fumigators, etc., with brief descriptions and indications of their use.

Drobot'ko (V. G.) (Ed.). Фитонциды в медицине, сельском хозяйстве и пищевой промышленности. [Phytoncides in medicine, agriculture, and food industry.] —200 pp., 1 fig., 4 graphs, Kiev, Publishers of the Ukrainian Acad. Sci., 1960. Roubles 8.20.

This collection of 87 short articles by Soviet authors comprises abbreviated versions of those papers presented at the Third All-Union Conference on problems of phytoncides, Kiev, 22–25 June, 1959 already noticed [**39**, 542]. Included are: R. M. Galach'yan (Sect. Microbiol. Acad. Sci. Armenian S.S.R., Erevan) (pp. 39–40) on the bactericidal properties of oils from *Mentha*, *Artemisia fragrans*, and sage (*Salvia draga cephaloides*). Mme K. I. Bel'tyukova (Inst. Microbiol. Ukrainian Acad. Sci., Kiev) on the phytoncides of cabbage and tomato and their role in the increase of resistance, particularly to *X*[*anthomonas*] *campestris*, *X. vesicatoria*, *E*[*rwinia*] *carotovora*, and *C*[*orynebacterium*] *michiganense* [**40**, 280] (pp. 43–45). Mme T. D. Verderevskaya (Kishinev agric. Inst.) gave some results (pp. 56–57) on the inactivation of tobacco mosaic virus by the sap of tomato and other *Lycopersicon* spp. Phytoncidal effect of vine leaf sap on *Plasmopara viticola* investigated by the Moldavian Sta. All-Union Inst. Plant Prot. was noted by Mme I. N. Naĭdenova (pp. 47–48); sap from mildew-resistant vars. killed the zoospores in 20–30 sec., that from susceptible vars. in < 10 min. At the N. Ossetin agric. Inst., according to Kh. K. Okazov (pp. 84–85), *P. viticola* was inhibited by phytoncides of ramsons [*Allium ursinum*]. V. V. Odikadze (Georgian Inst. Silkworm Breeding) noted (pp. 62–63) the use of the phytoncides of garlic against muscardine of silkworm (*Beauveria bassiana*); garlic extracts diluted 1:5 prevented germination of spores, and when sprayed on caterpillars reduced the incidence of infection by 78·4–84·3%.

Frear (D. E. H.). **Pesticide handbook.**—286 pp., Pa State Coll., Coll. Sci. Publishers, 1961. Paper bound $2.00; cloth bound $3.50.

This revised 13th edition [cf. **40**, 16] lists over 9,000 commercial pesticides, an increase of some 15% over the last edition.

Martin (H.). **Guide to the chemicals used in crop protection. Fourth Edition.**—*Publ. Res. Branch Canad. Dep. Agric.* 1093, 47 unnumbered (index) + 387 pp., 1961. $3. [Mimeographed, loose leaf.]

A further enlarged edition from Univ. Western Ont., London [cf. **38**, 180].

Buchanan-Davidson (Dorothy J.), Deese (D. C.), Uritani (I.), & Stahmann (M. A.). **Effect of synthetic polylysine on fungi.**—*Science*, **132**, 3440, pp. 1664–1665, 2 fig., 1960.

At Dept Biochem., Univ. Wis., Madison, polylysine (basic poly-α-amino acid) inhibited the growth of *Ceratocystis fimbriata*, *Verticillium alboatrum*, and *Fusarium* spp. in Czapek sol. at 100 µg./ml. At 100 and 500 µg./ml. infection of tomato plants by *F. oxysporum* f. [*F. bulbigenum* var.] *lycopersici* was prevented but these concs. of polylysine were phytotoxic.

Meltzer (H.). **Zur qualitativen und quantitativen colorimetrischen Bestimmung von Captan.** [Qualitative and quantitative colorimetric determination of

captan.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F. **14**, 9, pp. 193–195, 1960. [Russ., Engl. summ.]

Details of the methods used at the Biologische Zentralanstalt, Berlin.

Verona (O.). **Notizie intorno all'azione anticrittogamica della calciocianamide.** [Notes on the antifungal action of calcium cyanamide.]

Verona (O.), & Treggi (G.). **Sul potere anticrittogamico della calciocianamide. Nota I. Ricerche su di un primo gruppo di funghi fitopatogeni.** [On the antifungal power of calcium cyanamide. Note I. Researches on a first group of phytopathogenic fungi.]

Treggi (G.). **Nota II. Influenza sulla germinazione di clamidoconidi di Tilletia foetida (Wall.) Liro e Tilletia tritici (Bjerk.) Wint.** [Note II. Effect upon the germination of the conidia of *T. foetida* and *T. caries*.] -*Agricoltura ital.*, **60** (N.S. **15**), 9, pp. 287–313, 1 fig., 11 graphs. [86 ref.]; 10, pp. 338–345, 8 graphs; 12, pp. 415–422, 3 graphs, 1960. [10 ref.]

Treggi (G.). **Nota III. Comportamento, in presenza di calciocianamide, di Sclerotium rolfsii Sacc.** [Note III. The behaviour of *S. rolfsii* in the presence of calcium cyanamide.]—*Ann. Fac. Agr. Pisa*, **21**, pp. 97–102, 1 fig., 1 graph, [1960.]

Verona (O.) & Treggi (G.). **Nota IV. Ulteriori ricerche su di alcuni funghi fitopatogeni.** [Note IV. Further researches on some phytopathogenic fungi.]—*Agricoltura ital.*, **61**, 2, pp. 55–62, 8 graphs, 1961.

The 1st paper recapitulates the present state of knowledge of the fungicidal properties of $CaCN_2$; the remainder detail studies of its effects on numerous fungi.

Oda (H.), Sumi (H.), & Tanaka (Y.). **Fungicide for sheath blight control. I. Synthesis of organic arsine xanthates and their in vitro fungicidal activities. II. Effect of organic arsine xanthates against sheath blight on Rice.**—*Takamine Kenkyusho Nempo*, **11**, pp. 193–201, 1959. [Jap. *Chem. Abstr.*, **55**, 7, col. 6768 f, 1961.]

The method of preparation is described and the yields of 17 of these compounds are given, several of which proved to be antagonistic to *Aspergillus niger*, *Cochliobolus miyabeanus*, *Corticium sasakii*, *Fusarium oxysporum*, and *Xanthomonas oryzae*.

In a separate study of their effects on *C. sasakii* the following results were obtained. In $RAs[SC(:S)OR']_2$, when R is aryl, activity is low; when R is phenyl, max. activity occurs when R′ contains 8 C atoms; when R′ is ethyl, the activity changes with R methyl > propyl > benzyl; and when R is methyl it changes with R′ (propyl > ethyl). The most effective compounds were (R = methyl, R′ = propyl) and (R = propyl, R′ = hexyl).

Gjærum (H.). **Nye soppmidler.** [New fungicides.] -Reprinted from *Gartneryrket*, *1960*, 36, 5 pp., 1960.

Information is presented on 4 compounds newly marketed in Norway, viz. actidione, dodine (melprex) [**40**, 313], maneb, and vapam, with a few observations on their performance under local conditions. Actidione proved much less effective, e.g. than pure S against apple mildew [*Podosphaera leucotricha*], while the protection of roses against mildew [*Sphaerotheca pannosa*] was of brief duration, necessitating frequent applications: it may, however, be used with advantage against incipient infections.

In an experiment against apple scab [*Venturia inaequalis*] the percentages of infected leaves treated with 0·1% melprex and pure S were 1·9 and 3·8, compared with 13·4 for the controls.

Damping-off of cabbage, caused principally by *Rhizoctonia* [*Corticium*] *solani*, was controlled by vapam.

Smith (R. J.) & Read (W. H.). **Investigations on fungitoxic derivatives of salicylaldehyde. I. The 3-, 5-, and 3,5 chlorinated derivatives of salicylanilide and salicyl-para-chloroanilide.**—*Ann. appl. Biol.*, **49**, 1, pp. 102–109, 1961. [11 ref.]

In *in vivo* glasshouse tests at the Glasshouse Crops Res. Inst., Littlehampton, of the eradicative and protective effects of these materials [cf. **37**, 209] against cucumber powdery mildew (*Erysiphe cichoracearum*) and tomato leaf mould (*Cladosporium fulvum*), no compound was more effective than salicylanilide [cf. **38**, 291] at a non-phytotoxic conc. In *in vitro* tests, however, several were more fungitoxic to spores of *C. fulvum* than salicylanilide.

Le Tourneau (D.) & Buer (L.). **The toxicity of some chlorinated phenols and aryloxyalkanecarboxylic acids to Verticillium alboatrum.**—*Phytopathology*, **51**, 2, pp. 128–129, 1961.

Experiments on *V. alboatrum* growing in a liquid, synthetic medium at Univ. Idaho, Moscow, showed that in general these compounds are more toxic than had been thought [**36**, 709]. The phenol was more active than the corresponding aryloxyalkanecarboxylic acid; the addition of Cl atoms to the ring increased the toxicity of both phenols and acids; and that of the acids was increased by adding C atoms to the side chain. The fungicidal effect of these compounds was modified by the pH of the medium, and this should be taken into account when bioassays are made on plants treated with growth regulators.

Thorn (G. D.). **The fungicidal activity of acrolein phenylhydrazone and related compounds against rust.**—*Phytopathology*, **51**, 2, pp. 77–80, 2 graphs, 1961.

At the Pesticide Res. Inst., Canada Dept Agric., London, Ont., the activity of Monsanto CP 8621 against *Puccinia* spp. was shown to be due to acrolein phenylhydrazone.

Iwamoto (H.) & Kikuchi (M.). **Prevention of mold growth on industrial products. IX. Activity of various fungicides. 3. Organic mercury and tin compounds.**—*Hakkô Kyôkaishi* [*J. Ferment. Ass.*], **17**, pp. 306–309, 1959. [*Chem. Abstr.*, **55**, 6, col. 5846 f, 1961.]

In general, the 13 Hg compounds were more toxic than 4 Sn compounds tested against 30 moulds at the Fermentation Res. Inst., Chiba, Japan [**38**, 667]. Ethyl Hg oleate, ethyl HgCl, and ethyl Hg-*p*-toluenesulphonanilide inhibited the growth of all the spp. at a conc. of 1:200,000; ethyl Hg phosphate, phenyl HgCl, and methyl OC_2H_2 H_4HgCl at 1:100,000; and phenyl HgOAc, phenyl Hg urea, phenyl Hg-*p*-toluenesulphonanilide, phenyl Hg tris (hydroxy ethyl) NH_4 ($C_2H_3O_2$), and 4-methyl C_6H_4HgO acetate at 1:50,000. $Butyl_3$ SnO acetate was more potent than the propionate and butyrate, arresting development of all the moulds at 1:50,000. *Rhizopus nigricans* [*R. stolonifer*], *Pythium ultimum*, *Absidia regnieri*, *Aspergillus flavus*, and *A. terreus* were comparatively more resistant to the Hg, and *A. terreus*, *A. niger*, *Dipodascus albidus*, and *R. stolonifer* to the Sn compounds than the other spp. tested.

Rao (R. P.). **Thiazolidones and thiazolidiones as fungicidal agents.**—*Indian J. appl. Chem.*, **23**, 2, p. 110, 1960.

After 96 hr. the av. percentage inhibition of the growth of *Aspergillus niger* on agar produced by 5 of these compounds tested at Univ. Gorakhpur, India, was as follows: 3-phenyl-thiazolid-2:4-dione at 1:10,000 and 1:100,000, 48 and 25·6, respec-

tively; 3-*p*-chlorophenyl-2-*p*-chlorophenyl-iminothiazolid-4-one (IT), 43·3 and 24; 3-*o*-chlorophenyl-2-*o*-chlorophenyl-IT, 41·3 and 19·8; 3-*p*-methoxyphenyl-2-*p*-methoxyphenyl-IT, 33·8 and 19; and 3-phenyl-2-phenyl-IT, 33·8 and 22·3.

All the 3-aryl-2-aryliminothiazolid-4-ones and 3-arylthialozid-2:4-diones which were synthesized by the author are stated to contain > N-C-S-group, shown by Horsfall and Rich to be characteristic of many well-known fungitoxic compounds [**31**, 339].

Easterly (W. D.) & Dusenberry (J. E.). **Antifungal activity of some amides of dichloroacetaldehyde and bromal.**—*J. pharm. Sci.* (formerly *J. Amer. pharm. Ass.*, Sci. Ed.), **50**, 1, pp. 42–43, 1961.

Using a modification of a method described in *J. Soc. chem. Ind.*, **66**, p. 149, 1947, *J. Bact.*, **57**, p. 339, 1949, and *Tech. Bull. U.S. Dep. Agric.* 346, 1953, the authors determined the toxicity of the compounds to cultures of *Aspergillus niger* and *Trichoderma viride* on Sabouraud dextrose agar at Univ. Ark. Sch. Pharm., Little Rock. The max. activity against both spp. was shown by the dichloroacetaldehyde derivatives of α-chloroacetamide, benzamide, and phenylacetamide, and the bromal derivative of the 1st-named.

Lime-sulphur.—*Agric. Gaz. N.S.W.*, **72**, 1, pp. 47–48, 1961.

A useful note describing preparation on the farm, with a dilution table.

Staniland (L. N.). **Experiences in the use of fluorescent traced sprays as an advisory tool.**—*N.A.A.S. quart. Rev.*, **51**, pp. 132–138, 2 pl., 1961.

Examples are cited of the use of suspension tracer materials, such as saturn yellow [**39**, 380], with suspension sprays, e.g. captan and Cu oxide, or a water-soluble fluorescent dye such as primuline in polyvinyl alcohol to detect the distribution of the spray fluid itself in solving growers' spraying problems encountered in the course of the author's work with the N.A.A.S., Bristol. These included tests on greenhouse-grown cucumbers, and on potatoes, soft fruit, top fruit, and nursery plants in the field. A number of examples are quoted to show how the information obtained enabled beneficial changes to be made in pressures used, nozzle types and direction of spray, and various other factors involved in practical spray application.

Schnicker (J. L.). **Kemikaliekontrollen i finansåret 1959–60.** [Inspection of chemicals in the financial year 1959 60.]—*Tidsskr. Planteavl.*, **64**, 6, pp. 1056–1080, 1961.

Particulars of infringements of various regulations governing the composition and sale in Denmark of different groups of pesticides, presented in the usual form [cf. **39**, 663].

Specialpræparater anerkendte af Statens Forsøgsvirksomhed i Plantekultur til bekæmpelse af plantesygdomme af skadedyr. Gyldig for året 1961. [Special preparations recognized by the State Experiment Service in Plant Cultivation for the control of plant diseases and pests. Valid for the year 1961.] —*Tidsskr. Planteavl*, **64**, 6, pp. 989–1014, 1961.

An annotated list of fungicides and other pesticides authorized for use in Denmark [cf. **39**, 662].

Husain (S. M.). **Suggested changes in the terminology of plant disease control.**—*Plant Dis. Reptr*, **45**, 4, p. 263, 1961.

The modifications of Whetzel's terminology [**9**, 469] suggested in this paper from Glassboro State Col., N.J., are: 'selection' and 'physiocommutation' instead of 'immunization'; and 'protective inoculation' for 'vaccination'.

Verona (O.). **Considerazioni generali intorno alle infezioni crittogamiche portate dal seme.** [General considerations on seed-borne fungus infections.]—*Agricoltura ital.*, **40** (N.S. **15**), 6, pp. 192–210, 6 graphs, 1960.

A discussion of seed as a carrier of pathogens, with particular reference to the relation between infection and ambient temperature, humidity, and cultural practices. Methods of detecting seed infection are briefly described and notes given on the materials available for seed-treatments, with a list of fungicides and their composition and method of use. A list of antibiotics used in seed treatments is also given, with the diseases against which each is active.

Jørgensen (J.). **De rodinficerende svampes økologi.** [The ecology of root-infecting fungi.]—*Ugeskr. Landm.*, **104**, pp. 567–569, 583–587, 1 diag., 1959. [Received Mar. 1961.]

A summary and discussion of various recent studies on the subject [**30**, 440; **33**, 147, 256; **35**, 94, 696].

Richter (K.-H.). **Faserschädigungen durch Pilze.** [Fibre injuries by fungi.]—*Dtsch. Textiltech.*, **9**, 10, pp. 555–559, 15 fig., 1959.

Methods used at the Forschungsinstitut für Textiltechnologie, Karl-Marx-Stadt, Germany, for the determination of susceptibility to mould damage in textile fibres are described. The so-called 'mushroom-head reaction' (swelling in NaOH) proved to be much less sensitive and conclusive for linen than for cotton materials, injury to the former being more reliably established from wt. loss, strength reduction, or av. degree of polymerization. Cellulolytic organisms isolated from linen threads inoculated with spores from sole-leather waste included *Chaetomium globosum*, *Trichoderma lignorum* [*T. viride*], and *Penicillium* spp.

Hamburger (Brigitte). **Vergleichende Untersuchungen mit verschiedenen Schleimbekämpfungsmitteln.** [Comparative studies with different slime-control agents.]—*Papier*, **14**, 10a, pp. 532–534, 2 graphs, 1960. [Engl., Fr. summ.]

Of the preparations tested at the Feldmühle Papier- und Zellstoffwerke AG for efficiency in the control of 2 [unnamed] fungi and 1 bacterium particularly resistant to chemicals, which were freshly isolated from the slime of paper mills [cf. **40**, 401], the mercurials purapid and metasol, the S compound 35D, and the quinoline derivatives oxin and mergal K 98 inhibited growth at 15, 10–15, 15, 8, and 10 p.p.m., respectively, whereas 75–10,000 p.p.m. were necessary to achieve comparable results with the other 8.

Details are given of the methods of spore-counting used, and the practical applications of the experimental results are discussed.

Seeichi (N.) & Toshinobu (A.). **Studies of mold growth on corrugated board.**—*J. Jap. tech. Ass. Pulp Pap. Ind.*, **14**, 10, pp. 683–690, 1960. [Jap., Engl. summ. *Abstr. Bull. Inst. Pap. Chem.*, **31**, 7, No. 4352, 1961.]

Isolates from damaged cartons (for tinned export goods) comprised 12 spp. of *Aspergillus*, *Penicillium*, *Trichoderma*, *Sporotrichum*, and *Paecilomyces*. Development occurred within a wide range of temp. and humidity conditions, especially on the liner (compared with the corrugating medium, flute), indicating that contamination occurred after fabrication during handling and transport, rather than in the course of corrugation and other converting operations. The adhesive used for corrugating failed to support mould growth.

Celayeta (Filomena D.). **Action of filtrates of nutrient solutions in which various fungi have been cultured on the growth of Sphacelia segetum.**—*Farmacognosia*, **20**, pp. 63–90, 1960. [Span. *Chem. Abstr.*, **55**, 6, col. 5646 h, 1961.]

Filtrates that failed to inhibit the growth of *S. segetum* [*Claviceps purpurea*] in

ylinder-plate tests were those of *Pythium debaryanum*, *Aspergillus oryzae*, *A. avescens*, *Sclerotium rolfsii*, *Cercospora coffeicola*, and *Botrytis fabae*. A slight egree of suppression was produced by *Neurospora crassa* and a stronger one by *A. iger*, while *Fusarium oxysporum*, *Penicillium purpurogenum*, and *Trichoderma iride* were still more potent, a gliotoxin-producing str. of *T. viride* causing greater inhibition than one secreting viridin. Filtrates of *P. notatum* gave max. activity. Neither trituration of the mycelium before filtration or variation in culture vol. modified activity.

LEACH (C. M.). **The effect of near-ultraviolet irradiation on the sporulation of certain fungi. The relation of sporulation of Ascochyta pisi to wave length, intensity, and exposure length to monochromatic ultraviolet irradiation.**—Abs. in *Phytopathology*, **51**, 1, pp. 65–66, 1961.

In further work [**39**, 155] several fungi, including *Alternaria tenuis*, *Ascochyta pisi*, *Botrytis cinerea*, *Fusarium* spp., *Ophiobolus graminis*, and *Pyrenochaeta terrestris*, sporulated profusely when irradiated for 10 days at 70° F. with near-UV light (3,200–3,800 A). Non-sporulating strs. of *Helminthosporium oryzae* [*Ophiobolus miyabeanus*] produced conidiophores under continuous irradiation but required a further dark period of at least 4 hr. before conidia developed.

Short exposures at all wavelengths of UV tested induced pycnidium formation in *A. pisi* but long exposures inhibited sporulation except at 3,663 A. The shorter the wavelength the shorter the exposure necessary for max. sporulation and that required for inhibition. Wavelength, intensity, and length of exposure determined the position and size of pycnidia and affected the shape of the conidia.

PETERSEN (L. J.), DEVAY (J. E.), & HOUSTON (B. R.). **The effect of gibberellic acid on the parasitism of Rhizoctonia solani on Beans and Cotton.**—Abs. in *Phytopathology*, **51**, 1, p. 67, 1961.

Isolate Rh. 5 of *R.* [*Corticium*] *solani* from White Rose potatoes was stimulated by 10 p.p.m. K gibberellate in the culture medium, whereas 3 other isolates were not. Disease development in Red Kidney bean [*Phaseolus vulgaris*] and Acala cotton in soil infested with Rh. 5 was increased by leaf sprays at 50 p.p.m., but not with bean and the other isolates. Little, if any, of the compound was secreted from the roots.

SMITH (G. E.). **Effect of antecedent and immediate environment on a species of Cephalosporium producing an antibiotic.**—*Diss. Abstr.*, **21**, 5, p. 1018, 1960.

In further studies [cf. **36**, 791] at Ohio State Univ., Columbus, *C.* sp. (previously identified as *Micromonospora*) was inhibitory to *Fusarium in vitro* and *in vivo*. Inhibition and the effect on *F.* pigment development was striking when a suspension of *C.* conidia was added to agar on which mycelial disks of *F.* were placed 2 days later. The diam. of *F.* colonies on agar containing 50% filtrate of *C.* growing in a synthetic basal medium was not appreciably retarded, but when cysteine or methionine was added growth in diam. was appreciably lessened.

Symptoms of *F.* wilt were inhibited when roots of tomato plants were placed for 4 days in 50% *C.* filtrate from either the basal medium amended with L-cystine or corn meal-lactose-peptone broth before inoculation with *F.*

Details are given of the effect of temp., pH, nutrition, and light on growth and pigment production in *C.* sp.

STROBEL (J. W.). **Physiologically induced morphologic and pathogenic variations of some Glomerella cingulata isolates.**—*Diss. Abstr.*, **21**, 5, pp. 1014–1015, 1960.

Further studies [cf. **39**, 386] at Washington State Univ. indicated that the incidence of *G. cingulata* has increased greatly during the last 3 yr. It was identified on 43 spp. or vars. of foliage plants. Isolates were not stable in producing setae

in culture; some from acervuli without setae produced setae, some remained unchanged, while others from acervuli with setae often produced cultures without. Similarly, occurrence of setae on the inoculated host was erratic. On 9 standard media isolates were strong, intermediate, weak, or non-producers of setae. Naturally occurring compounds appear to influence production. Some isolates produced setae more prolifically in the light, some over a wide range of temp., and others, more sensitive to temp., only over a more limited range. Monoascospore isolates were either setose or non-setose. Certain growth substances, such as ascorbic acid and Ca pantothenate, as well as various standard media inhibited setal production in lines considered good producers.

Yuganova (Mme O. N.). Влияние внешних условий на развитие Монилии. [The effect of ambient surroundings on the development of *Monilia*.] –Науч. Зап. Херсон. сел.-хоз. Инст. [*Nauch. Zap. Kherson. sel.-khoz. Inst.*], *1959*, 8, pp. 155–167, 1959. [Abs. in *Referat. Zh. Biol., 1961*, 5, Sect. V, p. 8, 1961.]

Tests on synthetic and natural media showed that *M.* [*Sclerotinia*] *laxa* can grow under acid conditions (though better on a neutral medium), whereas *M. cinerea* [*S. laxa*] either fails to grow or development is weak.

Barton (R.). **Saprophytic activity of Pythium mammilatum in soils. II. Factors restricting P. mammillatum to pioneer colonization of substrates.**—*Trans. Brit. mycol. Soc.*, **44**, 1, pp. 105–118, 1961. [19 ref.]

In further studies at the Dept Cryptogamic Bot., Univ. Manchester [cf. **40**, 156], *P. mammillatum* was unable to colonize organic material already containing sugar fungi, cellulose-decomposing, or lignin-decomposing fungi, owing to the accumulation of staling substances. The biology of *P. mammillatum* in soils and the problems of the antagonisms involved are discussed with reference to the findings of others.

Herzog (W.). **Das Überdauern und der Saprophytismus des Wurzeltöters Rhizoctonia solani K. im Boden.** [The survival and saprophytism of the root killer *Corticium solani* in the soil.]—*Phytopath. Z.*, **40**, 4, pp. 379–415, 1961. [Engl. summ.]

In further studies [cf. **38**, 98] at Inst. für allgemeine Botanik, Friedrich Schiller Univ., Jena, Germany, the fungus was grown with hosts and non-hosts in forest, garden, and burnt loam soils. Stimulation of *C. solani* (by unknown plant substances) was least in the rhizospheres of non-susceptible Gramineae, increased progressively in the facultatively susceptible beets and legumes, and reached a max. in tomatoes and potatoes. Rhizosphere stimulation from cultivated plants penetrates into the soil and into the rhizospheres of weeds to a progressively greater extent as its own activity increases. This stimulation does not depend on the parasitism of the fungus. Hence the wide distribution of the fungus in the soil and low incidence of disease. Stimulation however increases with the susceptibility of the plant.

Though the stimulating effect of weeds on the fungus depends on the suitability of the soil, especially the raw humus content, it is independent of the weed sp. and is confined to their rhizospheres. The activity that extends from the root zones of cultivated plants can, however, impart a certain activity to the weed rhizospheres which alone they would not possess. Weed development in a field must be regarded as a not inconsiderable factor in soil infestation, since all weeds tested proved susceptible.

Park (D.). **Isolation of Fusarium oxysporum from soils.**—*Trans. Brit. mycol. Soc.*, **44**, 1, pp. 119–122, 1961.

At the Dept Bot., Univ. Manchester, 0·2 g. air-dry soil was incorporated into 20 ml. malt extract agar in a series of Petri dishes, the medium cooled, and the plates

stacked in a container in which the atmosphere was then replaced by 99% CO_2, the cultures incubated for 8–10 days at 30° C., and then kept on the bench for 1–3 days, after which colonies of *F. oxysporum*, originally present in populations of < 10 units/g. of soil, were easily detected. Over 60 isolates of the fungus grew normally under these conditions, which permitted the growth of very few other spp., only *Mucor racemosus* growing at all rapidly. Rose bengal agar was used with soils from which bacterial development was excessive. The ratio of soil to agar is important, and use of sloped tubes instead of plates was unsatisfactory.

Witkamp (M.). **Seasonal fluctuations of the fungus flora in mull and mor of an Oak forest.**—*Meded. Inst. Toegep. biol. Onderz. Nat.* 46, viii+51 pp., 3 fig., 21 graphs, 1960. [Dutch summ. 128 ref.]

In a study of the mechanism of the breakdown of forest litter in the Netherlands it was found that newly shed leaves of various trees had a limited fungal flora developing on agar plates, mainly Sphaeropsidales, *Pullularia*, and *Cladosporium*. In the 2nd yr. more colonies developed from oak leaves than in the 1st, and more so in leaves from mull than from mor, and *Penicillium* and *Alternaria* were partly replaced by *Trichoderma* and *Mortierella*.

In plate counts of the mineral soil of the calcareous mull mycelial growth and conc. of mycelium were lower than for the mor, and bacteria and actinomycete numbers highest. The acid mull was usually intermediate. The characteristics of the fungus flora of the different floor types appeared to be due primarily to water supply and Ca content. The composition and activity of the fungus flora of the mineral soil were directly affected by litter, desiccation, and pH of soil and by the activity of the saprophagous soil fauna and the non-fungal microflora.

The conc. of mycelium in an oak forest was highest in autumn or winter and lowest in spring and summer, but this annual fluctuation did not occur in pine. The conc. of mycelium in the mineral soil of a single forest floor type appeared to be positively correlated with humus and moisture content and negatively with depth.

Reinmuth (E.) & Seidel (D.). **Der Einfluss organischer Düngung auf den Befall von Keimpflanzen durch Pythium debaryanum Hesse und Rhizoctonia solani Kühn.** [The influence of organic manuring on the infection of seedlings by *P. debaryanum* and *Corticium solani*.]—*Naturwissenschaften*, **48**, 7, p. 227, 2 graphs, 1961.

Samples were taken at depths of 0–20 cm. from the 'annual mineral fertilizing' and 'annual stable manuring' treatments of a long-term experiment, started in 1933 on sandy soil with a slight admixture of clay at the Institut für Phytopathologie und Pflanzenschutz der Universität Rostock, Germany. They were mixed with sterile quartz sand (1:9) and after adjusting to 60% water capacity inoculated with equal quantities of mycelium of *P. debaryanum* and *C. solani*. Pre-germinated swede seeds were sown in this mixture in 300 ml. Neubauer dishes and kept in diffuse light in the greenhouse. The diseased (collapsed) plants were examined daily and on the 10th day the number of healthy ones was compared with that in the uninoculated, together with the microbial soil populations.

In the stable-manured soil (av. of all experiments) there was a distinct increase in the fungal and bacterial flora of the soil, correlated with more healthy plants with both fungi. From these data it is concluded that the multiplication of soil saprophytes affected the test fungi adversely.

Reeker (R.). **The prevention of molybdenum deficiency by application of peat as substrate.**—*Torfnachricht.*, **11**, 5–6, pp. 1–18, 1960. [27 ref. *Chem. Abstr.*, **55**, 8, col. 7728e, 1961.]

In pot experiments at Torfforschung, Bad Zwischenahn, Germany, 0·01–10 and

100 mg. NH_4 molybdate/l. peat was applied to lettuce, cauliflower, tomato, *Primula obconica*, antirrhinum, and zinnia. All, particularly *P. obconica*, receiving up to 1 mg. developed Mo deficiency symptoms, whereas none occurred at 1–10. Yield reductions resulted from treatment with 100 mg.

BARNETT (H. L.). **Illustrated genera of Imperfect Fungi.**—iii+225 pp., 462 fig., Minneapolis, Burgess Publishing Co., 1960. $4.50. [301 ref.]

This 2nd (revised) edition [cf. **35**, 126] increases the number of genera treated to 462.

KOHLMEYER (J.). **Pilze von der nördlichen Pazifik-Küste der U.S.A. (Ein Nachtrag.)** [Fungi from the northern Pacific coast of the U.S.A. (A supplement.)]—*Nova Hedwigia*, **3**, 1, pp. 85–91, 2 pl., 1961.

This further list of wood-inhabiting marine fungi [cf. **39**, 677] includes 1 addition to the Fungi Imperfecti in the area and 3 Ascomycetes (of which *Haligena elaterophora* Kohlm. represents a new genus).

Symposium on Sclerotium rolfsii.—*Phytopathology*, **51**, 2, pp. 107–128, 3 fig., 1961.

R. AYCOCK (pp. 107–108) presented a brief résumé of the characteristics and control of *S. rolfsii* to this meeting of the Southern Div. of the Amer. phytopath. Soc., Birmingham, Ala., Feb. 1–3, 1960.

E. WEST (Fla agric. Exp. Sta., Gainesville). **S. rolfsii, history, taxonomy, host range, and distribution** (pp. 108–109). [10 ref.] Studies on the perfect state [**39**, 679] (the name *Pellicularia rolfsii* has been proposed [**26**, 247; **33**, 184]) are reviewed. Host range (at least 189 plant spp.) and geographical distribution (tropics and warmer temperate areas [map 311]) are wide.

G. M. WATKINS (Texas A & M Coll., College Station). **Physiology of S. rolfsii, with emphasis on parasitism** (pp. 110–113). [20 ref.] It is concluded from a review of the literature, most of which has been noticed [cf. **30**, 447, *et passim*], that *S. rolfsii* is a facultative parasite, thiamine-deficient, and susceptible to the activity of antagonists in the soil. Since the invasive materials secreted (oxalic acid and carbohydrases) are water-soluble, the only anatomical basis for resistance is the periderm sheath.

W. E. COOPER (N. Carol. State College, Raleigh). **Strains of, resistance to, and antagonists of S. rolfsii** (pp. 113–116). [47 ref.] Very wide morphological variation has been reported though isolates from a given geographic area may be fairly uniform. While some cultures are homothallic, variation among single basidiospore cultures from individual isolates indicates that heterothallism occurs. Isolates have been shown to differ in virulence but host specialization has yet to be proved. The persistence of the pathogen in the soil and its resistance to control by crop rotation suggest that it is relatively resistant to antagonism or parasitism by other soil organisms.

C. WILSON (Auburn Univ., Ala.). **Comments on part I : Some gaps in our knowledge of S. rolfsii** (pp. 116–117). Fields requiring further research include the genetics of the fungus and the nature of its parasitism.

L. W. BOYLE (Ga Exp. Sta., Experiment). **The ecology of S. rolfsii with emphasis on the role of saprophytic media** (pp. 117–119). [4 ref.] In the absence of undecayed organic matter in the upper layers of the soil susceptible crops may be grown successfully even in soils infested with sclerotia. All cover crops, refuse, and weeds should be buried sufficiently deeply and mechanical damage to the new crop kept to a minimum, so that dead leaves do not provide a substratum for growth of the fungus. The application of these principles to the control of southern blight on groundnut is cited [**39**, 365].

K. H. Garren (Va agric. Exp. Sta., Holland). **Control of S. rolfsii through cultural practices** (pp. 120–124, 3 fig.). [17 ref.] This information has been noticed [loc. cit.]. It is suggested that deep covering might also give some control of the disease on lucerne and lespedeza.

A. L. Harrison (Texas agric. Exp. Sta., Yoakum). **Control of S. rolfsii with chemicals** (pp. 124–128). [38 ref.] The most promising fungicide, particularly on groundnut, is quintozene [**37**, 694, *et passim*], but some inconsistent results have been obtained and further research is necessary.

Hardison (J. R.), Meiners (J. P.), Hoffmann (J. A.), & Waldher (J. T.). **Susceptibility of Gramineae to Tilletia contraversa.**—*Mycologia*, **51** (*1959*), 5, pp. 656–664, [1961. 30 ref.]

The 11 grass spp. (including *Poa palustris*, the 1st record of dwarf bunt on this genus) infected by *T. contraversa* [**39**, 293], collected in the Pacific Northwest during 1958, are reported to be additions to the world list of hosts for dwarf bunt. Infection was also noted on *Bromus erectus* for the 1st time in N. America.

Brezhnev (I. E.). Материалы по экологии паразитных грибов из рода **Phyllosticta Pers.** учлесхоза «Лес на Ворскле». [Data on the ecology of the parasitic fungi of the genus *Phyllosticta* at the forestry training establishment 'Les na Vorskle'.]—Вестн. Ленингр. Унив. [*Vestn. Leningr. Univ.*], Ser. biol., **16**, 1, pp. 5–23, 1 graph, 1961. [Engl. summ. 48 ref.]

In surveys at and near 'The forest on the Vorskla', Belgorod region, 140 *P.* spp. were found on 131 hosts (98 gen., 41 fam.), including 20 spp. on Rosaceae, 10 on Leguminosae, and 7 each on Salicaceae, Caryophyllaceae, and Compositae; 75 of the spp. occurred on herbaceous and 65 on arboraceous plants [cf. **38**, 133]. There is a list of 15 spp. new to science. These fungi are mesophytes requiring high R.H. for development and are more common in forests than on the steppe or sandy terraces.

Bondartseva (Mme M. A.). Критический обзор новейших систем семейства **Polyporaceae.** [A critical survey of the most recent classification systems of the Polyporaceae.]—*Bot. Zh. S.S.S.R.*, **46**, 4, pp. 587–593, 1961.

In this survey from the V.L. Komarov bot. Inst., Acad. Sci. U.S.S.R., Leningrad, the author concludes that none of the extant systems can be considered as having universal application. The use of hyphal systems as a basis for systematics has not justified itself. The classification most widely used in the Soviet union is Bondartsev's [**36**, 669].

Sörgel (G.). **Zum Problem der Trennung von Arten bei Pilzen, dargestellt am Beispiel der Ascomycetengattung Chaetomium.** [On the problem of the separation of fungus species, as exemplied by the Ascomycete genus *Chaetomium*.] —*Arch. Mikrobiol.*, **36**, 1, pp. 51–66, 4 fig., 4 graphs, 1960.

An investigation of *Chaetomium* [**29**, 585; **35**, 700] at the Inst. für Pflanzenzüchtung der Deutschen Akademie der Landwirtschaftswissenschaften, Quedlinburg, Germany, was used to determine the principal characteristics, enumerated and described, by which the spp. could be distinguished; these were the shape and colour of the spores, the shape of the chlamydospores and the ascus, the arrangement of the ascospores, and the colour, shape and size of the perithecia.

Snider (P. J.). **Stages of development in rhizomorphic thalli of Armillaria mellea.** —*Mycologia*, **51** (*1959*), 5, pp. 693–707, 5 fig., [1961. 24 ref.]

In studies at Harvard Univ., Cambridge, Mass., the rhizomorphs [cf. **40**, 344] were easily cultured on potato extract glucose agar. The general aspects of development are described and thallus development is divided into 5 stages: pre-emergence,

emergence, lag phase of rhizomorph growth, linear phase, and terminal phase; some details of growth and anatomy are described and figured.

Johnson (T.). **Man-guided evolution in plant rusts.** —*Science*, **133**, 3450, pp. 357–362, 6 fig., 1961. [19 ref.]

A review, with special reference to cereal rusts, of the interaction between rusts and their hosts and the effects of breeding for host resistance in modifying rusts.

Hellmers (E.). **Kransskimmel eller Verticillium-hadromykose (Verticillium alboatrum Reinke og Berthold og V. dahliae Klebahn).** [Wreath fungus or *V.* hadromycosis (*V. alboatrum* and *V. dahliae*).]—*Horticultura*, **15**, 2, pp. 19–28, 4 fig., 1961. [43 ref.]

A cursory perusal of the literature has revealed at least 600 papers dealing with this disease, of which Rudolph's [**10**, 757] is the most important. Essential information is summarized mainly from the latter source, supplemented by subsequent studies, under the headings of history and distribution of the disease, the pathogens, description of the disease, etiology, and control.

The following are hosts of the *V.* spp. in Denmark: *Acer*, *Aesculus*, *Armoracia*, *Begonia*, *Callistephus*, *Cucumis*, *Hydrangea*, *Lycopersicon*, *Medicago*, *Prunus*, *Psalliota*, *Rhododendron*, *Rosa*, *Rubus*, *Sambucus*, *Senecio*, *Solanum*, *Ulmus*, and *Vitis* spp. (oral communication from Phytopath. Exp. Sta., Lyngby).

Stapel has shown (*Ugeskr. Landm.*, **90**, pp. 125–127, 1945; *Landbonyt*, *1956*, pp. 317–321, 1956) that, apart from direct root-to-root contact, infection in the lucerne crop is spread almost exclusively by means of implements, especially in wet weather, when cutting should consequently be avoided.

Staley (J. M.) & Lyon (H.). **An electrical aid to pure culture isolation.**—*Plant Dis. Reptr*, **45**, 4, pp. 312–313, 1 fig., 1961.

A method is described from Cornell Univ., Ithaca, N.Y., whereby the drawn end of a soft glass rod can be shaped under a dissecting microscope by using the heat from a length of suitable wire shorted across an electric plug held on a wooden stage in place of the usual glass stage. Current control varies the heat obtained and a variety of tools for micromanipulation can be fashioned.

Lebedev (G. V.). Форсунка для тонкого разбрызгивания жидкости при низком давлении и малом ее расходе. [An economical sprayer for the fine atomization of liquids under low pressure.] –Физиол. Раст. [*Fiziol. Rast.*], **7**, 1, pp. 127–128, 1 fig., 1 graph, 1960. [Engl. summ.]

The construction of the atomizer designed for use at the Timiryazev Inst. Plant Physiol., Moscow, and especially suitable for the application of small quantities of highly active substances to plants, is described. The liquid is delivered under pressure spirally through the nozzle.

Silber (G.). **A portable gas sampler suitable for measuring atmospheric oxidant.**—*Plant Dis. Reptr*, **45**, 4, pp. 310–311, 1 fig., 1961.

A short description of the apparatus from U.S. Dept Agric., Beltsville, Md, for determining toxic ozone [**40**, 342].

Williamson (D. H.) & Scopes (A. W.). **Synchronization of division in cultures of Saccharomyces cerevisiae by control of the environment.** *In* Meynell (G. G.) & Gooder (H.) (Editors). *Microbial reaction to environment*, pp. 217–242, 2 pl., 9 fig., Cambridge Univ. Press, 1961. (11th Symp. Soc. gen. Microbiol.) [45 ref.]

A critical review and discussion of the theory and practice of culture synchronization.

Bockstahler (L. E.) & Kaesberg (P.). **Bromegrass mosaic virus : a virus containing an unusually small ribonucleic acid.**—*Nature, Lond.*, **190**, 4771, pp. 192–193, 2 graphs, 1961.

Studies by Dept Biochem., Univ. Wis., Madison, indicated that the molecular wt. of brome mosaic virus [cf. **38**, 503] was $4{\cdot}6 \times 10^6$ and of its ribonucleic acid 1×10^6, thought to be the lowest weights for any known virus.

Carter (W.). **Ecological aspects of plant virus transmissions.**—*Annu. Rev. Ent.*, **6**, pp. 347–370, 1 map, 1961. [138 ref.]

From Pineapple Res. Inst., Honolulu, Hawaii, a review of the movements of vectors, factors affecting these, plant host sequence, the physical factors of the environment, the virus source, populations and their movements, and behaviour factors.

Darlington (W. A.). **The effect of substituents on the antiviral activity of 3-aminopropionitrile in plants.**—*Virology*, **13**, 2, pp. 164–168, 1961.

At the Monsanto Chemical Co., Dayton, Ohio, it was found that certain 3-alkylaminopropionitriles are very active against tobacco mosaic virus multiplication in leaf disks, local lesion production on *Nicotiana glutinosa* and Pinto bean (*Phaseolus vulgaris*), and local lesion production by tobacco ring spot virus on bean. Max. activity in both kinds of test occurred with straight-chain alkyl derivatives having 12–14 C atoms.

Hansen (H. P.). **Laerebog i systematisk plantevirologi med saerligt henblik på viroser i danske landbrugsafgröder.** [Text-book of systematic plant virology, with special reference to viroses in Danish agricultural crops.]—61 pp., 5 fig., 3 graphs, 5 maps, Det kgl. danske Landhusholdingsselskab, København, 1961. [275 ref.]

This treatise is stated to be the 1st based on a systematic classification of viruses according to their properties instead of on their hosts [cf. **40**, 211 *et passim*]. Following an introduction, chapt. 1 is concerned with Invirales (i.e., virus spp. without specific insect vectors); chapt. 2 with Aphivirales (aphid-borne); chapt. 3 with Cicavirales (cicada-borne); and chapt. 4 with Xenovirales (with several different types of vectors); chapt. 5 comprises reviews of the available information on systematic classification in natural groups, general characters of the principal groups, most important modes of infection and particle shapes, and some viroses of economic crops.

Izard (C.). **Sur l'utilisation de la ninhydrine comme adjuvant des réactions sérologiques en gel ; application aux virus des plantes.** [On the utilization of ninhydrin as an adjuvant of serological reactions in agar; application to plant viruses.]—*C.R. Acad. Sci., Paris*, **250**, 23, pp. 3906–3908, 1960.

The viruses used in these experiments reported from the Institut Expérimental des Tabacs, Bergerac, were tobacco and cucumber mosaic, and the method was adapted from Van Slogteren's [**34**, 822]. The results clearly demonstrated the value of ninhydrin at 20 mg./ml. in the acceleration of precipitation of the antigenic components of the viruses, thereby facilitating the process of double diffusion through the agar which is helpful in the study of strains [cf. **39**, 239].

Chapman (R. K.). **Some factors affecting the transmission of plant viruses.**—*Proc. ent. Soc. Manitoba*, **15**, pp. 14–23, 1959. [21 ref.]

A discussion from Dept Entomology, Univ. Wis., of some of the factors involved in field and laboratory.

Атавекоv (I. G.). Использование отечественных ионитов при очистке вирусов растений. [The use of Soviet ionites for purifying plant viruses.]—Воп. Вирусол. [*Vop. Virusol.*], **5**, 4, pp. 496–500, 2 fig., 1960.

In tests with purified preparations of several viruses the chlorate and acetate forms of the ionites AN-2F, EDE-10, and AV-16, and the H form of the cationites KU-2 and 4KB-4p2 were shown to have a very weak adsorption capacity. They can, however, be used in the purification of virus preparations, as they readily adsorb pigments, melanin, and other dye compounds present in plant homogenates. The charge of these substances should be predetermined by paper electrophoresis and anionites or cationites used accordingly.

Bercks (R.). **Serologische Verwandtschaft zwischen Kartoffel-Y-Virus, Rübenmosaik-Virus und Phaseolus-Virus 2.** [Serological relationship between Potato virus Y, Beet mosaic virus, and Bean yellow mosaic virus.] —*Phytopath. Z.*, **40**, 4, pp. 357–365, 1961. [Engl. summ.]

At Inst. für Virusserologie, Brunswick, distant serological relationships between the 3 viruses [**40**, 213] were established by reciprocal testings, for which very high titered antisera were especially suitable. The only available antiserum to beet mosaic virus, with the comparatively low titre of 1:600, did not react with the 2 heterologous antigens (expressed sap of infected plants and purified virus preparations). In addition to the usual controls tests against other heterologous antigens were made, which demonstrated a serological relationship between viruses which differ in their normal lengths. The findings support classification on the basis of particle morphology [**38**, 585] and show that viruses can be classified on the basis of their natural relationships.

[This paper also appeared in *Virology*, **12**, 2, pp. 311–313, 1960.]

Moorhead (Ellen L.). **The enhancement of antibody response by the use of adjuvants in Rabbits immunized with purified plant viruses.**—*Virology*, **13**, 2, pp. 249–255, 2 graphs, 1961. [18 ref.]

At the Crops Res. Div., U.S. Dept Agric., Lincoln, Neb., a water-in-oil emulsion of purified virus produced rabbit serum of higher titre than a phosphorylated hesperidin adjuvant when tobacco mosaic virus and barley stripe virus were used as antigens. Both adjuvants produced sera of equally good titres when the virus antigens were brome mosaic and southern bean mosaic [bean southern mosaic virus].

Thomson (A. D.). **Effect of Tobacco mosaic virus and Potato virus Y on infection by Potato virus X.**—*Virology*, **13**, 2, pp. 262–264, 1 fig., 1961.

At D.S.I.R., Christchurch, N.Z., the number of local lesions produced by virus X on White Burley tobacco leaves was increased by TMV or virus Y, whether established in the leaves before inoculation with X or mixed with it in the inocula [cf. **37**, 581]. Lesions caused by X were usually more clearly defined in the presence of the other viruses. The phenomenon may perhaps be used to increase the sensitivity of infectivity tests with virus X.

Sackston (W. E.). **Aster yellows—a challenging problem in plant pathology.**—*Proc. ent. Soc. Manitoba*, **15**, pp. 23–30, 1959. [11 ref.]

A review from the Canada Agric. Res. Sta., Winnipeg, of the host range, distribution, and symptoms of aster yellows virus [**37**, 710]. The occurrence and severity of outbreaks and str. differences observed in Man., Sask., and near Lethbridge, Alta, appear to be determined by wind-borne, migrant leafhoppers (*Macrosteles fascifrons*) from the south.

Hendrix (J. W.). **Soil transmission of Tobacco ringspot virus.**—*Phytopathology*, **51**, 3, p. 194, 1961.

Virus-free soil was infested with tobacco ring spot virus at the Dept Plant Path., Univ. Ark., Fayetteville, by growing infected cucumber or watermelon plants in it and removing the tops. Some of the healthy cucumber, watermelon, and pea plants grown in the infested soil developed infection, which was confirmed by indexing. The virus was also recovered from watermelon and tobacco grown in soil from a field where watermelon pimples [**40**, 160] had been prevalent the previous year.

Dyson (Joan G.) & Chessin (M.). **Effect of auxins on virus-induced leaf abscission.**—*Phytopathology*, **51**, 3, p. 195, 1961.

At Dept Bot., Mont. State Univ., Missoula, naphthalene acetic acid sprays at 1,000 p.p.m. prevented premature leaf abscission in *Physalis floridana* inoculated with tobacco mosaic virus.

Uschdraweit (H. A.). **Eine für Deutschland neue Virose bei Vaccinium myrtillus.** [A virosis of *V. myrtillus* new to Germany.]—*Phytopath. Z.*, **40**, 4, pp. 416–419, 2 fig., 1961. [Engl. summ.]

The virus nature of witches' broom disease of *V. myrtillus* found in N. Bavaria and apparently identical with that in the Netherlands [**40**, 420] was demonstrated at the Inst. für gärtnerische Virusforschung, Berlin-Dahlem, by grafting, but its relationship to other viroses of *Vaccinium* is still unknown.

Report of the first F.A.O. technical Cacao Meeting held in Accra, Ghana, Africa.—*Cacao (Int. Amer. Cacao Cent.)*, **4**, 3, pp. 1–15, 1959. [Received 1961.]

A preliminary account of this meeting has been noticed [**39**, 291]. The sessions which included subjects of phytopathological interest were the 1st, on rehabilitation problems, the 2nd, on selection and breeding, the 4th, on diseases, and a supplement to the 5th, on quarantine measures. Contributions to the 4th were: R. Egli, 'World survey of cacao diseases'; T. W. Tinsley, 'World survey of virus diseases'; A. L. Wharton, 'Black pod and other diseases of immediate or potential importance in W. Africa' and 'Problems of black pod disease in Ghana'; J. Grimaldi & R. Muller, 'Fungus diseases of the cacao tree in the Cameroons'; D[orothy] E. Shaw, 'Diseases in the Territory of Papua and New Guinea'; R. G. Orellana, 'Approach to the development of *Phytophthora*-resistant cacao'; and A. Attafuah & J. W. Blencowe, 'A virus disease of cocoa in Sierra Leone'. In the discussion it was suggested that F.A.O. should organize a world survey of cacao virus diseases: the Netherlands offered quarantine facilities. As cushion gall [**39**, 563] may remain latent for many years, the min. quarantine period must be determined.

Black pod (*P. palmivora*) [**40**, 94] and its control were discussed at length, since losses can be very heavy (< 90%). Suggestions were made that regional research on *P. palmivora* should be expanded and that a centre for fundamental research on black pod with particular reference to var. resistance should be established outside cacao-growing areas.

Recommendations at the 5th session included the establishment of 3 regional plant quarantine stations: in Puerto Rico for America and the Caribbean, in Nigeria for Africa, and on a Pacific island for S.E. Asia and the Pacific region.

Eighth Inter-American Cacao Conference, 1960.—513 pp., 6 pl., 21 fig., 4 diag., 8 graphs, Trinidad, Govt. Press, [? 1961].

The papers in the pathology and entomology sect. (pp. 155–301) of this conference [cf. **40**, 292], held in Trinidad, 15–25 June 1960, are:

E. Ampuero (Ecuador) & R. Desrosiers (Costa Rica). [Comparison of resistance to witches' broom for clones Silecial and Silecia 5 in eastern Ecuador. Span.] (pp. 156–164). Data presented show that Silecia 5 is more resistant to *Marasmius perniciosus* than Silecia 1, and both had less infection than the Scavinas. Further expeditions to collect resistant material in the Amazon area are recommended.
E. Ampuero. [Progress made in Ecuador in the selection programme for resistance to witches' broom. Span.] (pp. 166–176) Data are presented of selections made in Ecuador in 1949; 64 trees that have remained unaffected by *M. perniciosus* will be used in future breeding work.

E. Ampuero & R. Alvarado. [Variation in resistance to witches' broom, annual yield as the pod index in hybrid interclonal progeny. Span.] (pp. 174–179). Six selections from crosses in Ecuador between high yielding clones and clones resistant to *M. perniciosus* are noted.

J. C. Delgado, E. Ampuero, & K. D. Doak. [Possible evidence of resistance to *Monilia roreri* Cif. and Par. in some clones at the Trop. Exp. Sta., Pichilingue. Span.] (pp. 184–191). Observations in Ecuador of pod infection in 52 clones over 3 yr. failed to demonstrate inherent resistance, though there were differences in incidence of infection.

M. Delassus, M. Belin, & P. Bonaventure. [Contribution to the study of cacao pod rots in the Lower Ivory Coast during the years 1958 and 1959. Fr.] (pp. 193–195). This information on *Phytophthora palmivora* has been noticed [**40**, 292].

G. Ocana & A. J. Hansen (Turrialba). **Preliminary studies on the use of agricultural spray oil for the protection of Cacao against Phytophthora palmivora** (pp. 196–200). Oil sprays do not give control but infection is delayed and the effect of Cu sprays augmented. There should not be more than 50% oil in the spray if phytotoxicity is to be avoided.

E. F. Iton. **Ceratostomella wilt in Cacao in Trinidad** (pp. 201–207). This information on the association of *Ceratocystis fimbriata* and *Xyleborus* spp. has been noticed [**39**, 685]. Spores collected in faeces have been germinated.

D. Day, J. F. Longworth, & J. M. Thresh. **The interaction between swollen shoot disease and mirids on cocoa in Nigeria** (pp. 224–235). The results obtained at the W. Afr. Cacao Res. Inst., Ibadan, since 1956 in controlling capsids and *Calonectria rigidiuscula* [**38**, 315] and thus preventing swollen shoot virus [**40**, 160 *et passim*] from becoming lethal are outlined. Yield and growth have been greatly improved.

A. M. Gorenz. **Transmission of the cushion gall disease of Cacao** (pp. 249–254). At La Calera agric. Exp. Sta., Nicaragua, when bark with green-point type cushion galls [**39**, 223] was grafted on 3 healthy trees galls appeared near the graft on 2 trees 8 and 17 months later.

L. M. Hutchins. **Transmission tests with cushion gall of Cacao** (pp. 255–262). Greenpoint gall was transmitted in 4 different ways at Turrialba [loc. cit.]: 14 of 143 tissue transplantations on to cacao pod stalks, 3 of 6 inoculations with detached galls bound to healthy flower cushions, 3 of 50 gall-infusion inoculations of cacao beans, and 4 of 50 brush inoculations from galls to half-beans were successful. Inoculations with bacteria from cushion galls did not reproduce the disease and attempts to transmit flowery gall [loc. cit.] have not been successful.

L. R. Siller. **An attempt to transmit cushion gall of Cacao by bud grafting and the effect of malathion on gall development** (pp. 263–266). At Turrialba, Costa Rica, there was a marked decrease in cushion gall spread among 4–6-yr.-old cacao cuttings sprayed with malathion every 21 days. It is suggested that the infective agent was prevented by the insecticide from moving into new bud growth.

M. Soria (Turrialba). **A note on the relationships between flowery cushion gall, self-incompatibility and flower development** (pp. 267–269). Flowery galls rarely develop fruit, owing to failure of pollination, though most of the flowers develop normally.

L. Goberdhan & D. Ganpat. **Cushion gall of cocoa in Trinidad** (pp. 271–279). Only the green-point gall has been found in Trinidad, where it occurs throughout the island. The condition is favoured by moisture and only young growing tissue is affected.

L. M. Hutchins & L. R. Siller. **Cushion gall types in Cacao** (pp. 281–287). The term 'cushion gall' covers 5 types of outgrowths from cacao flower cushions [loc. cit.] which are described and illustrated. Hard flat gall is renamed disk gall; this and knob gall are relatively unimportant compared with green-point and flowery gall. Sometimes cushion galls develop 'fan galls', branched stem-like outgrowths several in. long, with very short internodes, resembling a fan when grouped.

R. Alvarado, E. Ampuero, & K. D. Doak. [Reaction of different clones and hybrids to cushion gall of cacao. Span.] (pp. 290–299). Of 238 clones examined at Pichilingue 14 had cushion gall, as did 28 of 66 interclonal hybrids. The susceptibility is tabulated.

Hasselo (H. N.) & Price (D.). **The assessment of black pod disease control in Cocoa by mistblowing.** *Trop. Agriculture, Trin.*, **38**, 2, pp. 133–144, 3 graphs, 1961.

The losses caused by *Phytophthora palmivora* [cf. **40**, 32, 215 and above] in a plot of 500 cacao trees at Tombel, S. Cameroons, were estimated from weekly records of rejected pods over 3 in. long. Black pod was controlled by mistblowing 3 lb. Cu fungicide in 15 gal. water about 10 times annum. Statistical analyses, described in detail, of the relationship between yield and black pod enabled the potential losses in subsequent yields in the area to be estimated; a comparison with the actual loss gave an indication of the efficiency of control treatments. It is estimated that losses in the test plot would have been at least 60% if unsprayed; they were reduced to 15% by mistblowing, which is unsatisfactory when the canopy is dense; spraying in the dry season when there are no pods is desirable to protect young leaves from infection. This protection of the canopy is as important as that of the pods, though the necessary frequency of dry season spraying has not yet been assessed. The size of 30-yr.-old trees is such as to render effective coverage of the canopy from below difficult and spraying from aircraft might be necessary.

Annual Report of the Plant Breeding Institute, Cambridge, 1959/60.—viii + 72 pp., 1961. 5*s.* 6*d.*

There are, as usual, references to disease resistance throughout the crop sections of the report [cf. **39**, 563].

It is noted in the pathology sect. (pp. 63–67), under R. C. F. Macer, that the 1st appearance of *Puccinia graminis* on wheat (5 July 1960) was the earliest recorded at the Institute. Uredospores of *P. glumarum* [*P. striiformis*] vacuum-dried and stored *in vacuo* were viable after 3½ yr. This rust was found on Chinese 166, Halle 3435/46, and Dippes Triumph wheats, which had previously been resistant; the level of resistance to races 2B and B8 in Chercher 4, Chercher 14, Akaki 28, and Etaya 1 from Ethiopia was high.

More rapid methods of inoculating field soil with *Cercosporella herpotrichoides* [**40**, 97], involving either spraying plots with a conidial suspension or distributing infested match-splints, were less effective than the original one of using colonized straw.

During 1960 races 17, 21, and 133 of *P. graminis* were identified.

Pugsley (A. T.). **Additional resistance in Triticum vulgare to Erysiphe graminis tritici.**—*Aust. J. biol. Sci.*, **14**, 1, pp. 70–75, 1961.

At the Agric. Res. Inst., Wagga Wagga, N.S.W., further studies [cf. **34**, 520] showed P.I. 92378, P.I. 181374, and the derived Javelin-325 to possess the Ulka gene Ml_u, while Asosan [cf. **39**, 18] was shown to possess a 6th gene Ml_a, not previously detected. A race (T) of *E. graminis tritici* capable of attacking those vars. carrying the Ml_t gene alone provided further evidence of the genetic constitution of the several experimental vars. Four 'tester' lines, each with a Federation background and carrying singly Ml_t, Ml_s, Ml_u, and Ml_a should prove useful in physiological race determinations.

Oltarzhevskiĭ (N. P.) & Tarakanov (S. G.). Об устойчивости Пшениц к грибным заболеваниям в Средней Азии. [On resistance of Wheat to fungus diseases in Central Asia.]—Узб. биол. Ж. [*Uzb. biol. Zh.*], *1960*, 6, pp. 9–13, 1960. [Uzb. summ.]

Over 1,200 samples from 46 countries were assessed for resistance to fungus diseases in 1957–8 at the Central Asian exp. Sta., All-Union Inst. Plant Breeding, using the N.I. Vavilov 5 point scale. Most vars. were highly susceptible. Among samples of *Triticum aestivum* with complex resistance to *Puccinia triticina* [*P. recondita*: **40**, 409, 461], *P. glumarum* [*P. striiformis*: **40**, 217], and *Erysiphe graminis* [**40**, 295] were Golubka from Kazakhstan, Belotserkovskaya 37 from the Ukraine, Belorusskaya 15 from Byelorussia, Frassineto from Italy, Austro-Bankuti from Austria, Pommets from Norway, Major from Australia, Ottawa 19 A from Canada, Ministre from Belgium, and Hon iku from Japan.

McNeal (F. H.), Mills (I. K.), & Berg (M. A.). **Variation in Barley stripe mosaic virus incidence in Wheat seed due to storage and continuous propagation and the effect of the disease on yield and test weight.**—*Agron. J.*, **53**, 2, pp. 128–130, 1 graph, 1961.

In tests by Crops Res. Div. U.S. Dept Agric. and Mont. agric. Exp. Sta. average yield losses for 8 hard red spring wheat vars. [**37**, 652; **39**, 686] were 18·3–26·8%. Reduction in test wt. was of no economic importance. Field counts, which were correlated only inconsistently with greenhouse counts, showed increased incidence in Pilot and Centana, about the same in Rescue, and decreased incidence in Lee, C.I. 13041, C.I. 13042, Supreme, and Thatcher. Greenhouse sowings indicated that seed storage had little or no effect on percentage seed infection [**40**, 164].

French (R. C.). **Stimulation of uredospore germination in Wheat stem rust by terpenes and related compounds.**—*Bot. Gaz.*, **122**, 3, pp. 194–198, 1961.

In further studies [**37**, 274] at the U.S. Army chem. Corps, Fort Detrick, Frederick, Md, the majority of the compounds capable at certain concs. of hastening uredospore germination of *Puccinia graminis* on water induced a stimulation at least that of a stimulatory material extracted from the uredospores themselves [cf. **38**, 589].

Van Sumere (C. F.), Degreef (J. A.), & Teuchy (H.). **The existence of an adaptive mucilagenase in uredospores of Puccinia graminis var. tritici.**—*Naturwissenschaften*, **48**, 8, p. 306, 1 graph, 1961.

Further studies at the Biochem. Lab. Rijksuniversiteit, Ghent, Belgium [cf. **37**, 152], demonstrated the opt. pH to be 7·4 and the opt. temp. 45° C. for enzyme production.

Krog (N. E.), Le Tourneau (D.), & Hart (Helen). **The sugar content of Wheat leaves infected with stem rust.**—*Phytopathology*, **51**, 2, pp. 75–77, 1961.

At Minn. agric. Exp. Sta., St. Paul, Kenya 122 (resistant to *Puccinia graminis*

race 15 B at 65° F. and susceptible at 85°) and Newthatch (susceptible at both temps.) were grown at these temps. and inoculated. The total sugar content of healthy leaves [cf. **38**, 194] 2 weeks later was higher at 65° and slightly higher in Kenya 122 than in Newthatch. The major soluble sugar was sucrose. Infection decreased total sugar, and especially sucrose, slightly in the resistant var. and greatly in the susceptible, the decrease being closely related to severity.

Haegermark (U.). **Einige Versuche über die fungizide Wirkung von Kalkstickstoff auf Cercosporella herpotrichoides Fron.** [Some tests on the fungicidal action of calcium cyanamide on *C. herpotrichoides*.]—*Meded. Växtskyddsanst., Stockh.*, **11**, 81, pp. 485–491, 1960. [Swed. summ.]

Winter wheat straw collected during the summer of 1956 near Kalmar, Linköping, and Svalöf, Sweden, was inoculated in the laboratory with *C. herpotrichoides* and either dusted with $CaCN_2$ or laid for 10 days at 15° C. in soil treated with the compound. At levels corresponding to those used in practice, e.g. 200 and 400 kg. ha., the compound was fungicidal directly applied to the straw, the latter rate giving the best results. In the soil it was necessary to use excessively large quantities (800 kg. ha. and upwards) to obtain a comparable effect. However, in a few tests where the straws were left for 5–6 weeks at 2–4° somewhat lower doses appeared to be fungitoxic.

Chambers (S. C.). **Bare patch and poor emergence of cereals—factors under investigation. 1. Seed treatment and moisture content.**—*J. Agric. W. Austr.*, Ser. 4, **2**, 3, pp. 245–247, 1961.

Tests indicated that poor emergence of wheat due to overdosage of organic Hg seed dressing may occur if the moisture content of grain [cf. **39**, 225] near maturity had been raised unduly, as by rain storms.

Green (G. J.) & Samborski (D. J.). **Cereal rusts in Canada in 1960.**—*Canad. Pl. Dis. Surv.*, **41**, 1, pp. 1–21, 1 map, 1961.

This general survey revealed that owing to the hot dry summer of 1960 rust infection was generally light and caused few losses. Leaf rust (*Puccinia recondita*) was the most prevalent, with up to 50% infection in susceptible vars. by early Aug. *P. graminis* on oats and wheat was unusually scarce. The distribution of the rusts and their physiologic races [cf. **38**, 685] are fully tabulated.

Forsyth (F. R.) & Jursic (F.). **Improving the protective fungicidal activity of nickel sulphate against leaf rust of Wheat and crown rust of Oats.**—*Canad. Pl. Dis. Surv.*, **41**, 1, pp. 22–30, 1961.

At the Pesticide Res. Inst., London, Canada, the inclusion of 0·1% triton X-114, 0·1% sulphonated castor oil, a constituent of atlox G-3300 at 0·25%, or 0·25% indopol L-10 with 400 p.p.m. $NiSO_4.6H_2O$ [**39**, 565] improved the protective action of the latter against leaf rust [*Puccinia recondita*] on wheat and crown rust [*P. coronata*] on oats. Imperial oil 862-B at 0·3% was effective for leaf rust only. The fungicidal activity of these formulations persisted after ½ in. artificial rain.

Kobel (F.). **Über das Vorkommen der Gelbverzwergung des Getreides (Hordeum-virus nanescens) in der Schweiz.** [On the occurrence of Barley yellow dwarf virus in Switzerland.]—*Phytopath. Z.*, **40**, 4, pp. 366–372, 5 fig., 1961. [Engl. summ.]

The virus was found on oats in summer 1960 in a mountain valley (3,600 ft.) in Canton Wallis and transmitted by *Rhopalosiphon padi* to young oat and barley plants at the Eidg. landwirtschaftliche Versuchsanstalt, Zürich-Oerlikon. It is thought that the disease is widespread throughout the cereal growing region in

summer but causes no damage because infection occurs too late. Winter wheat escapes infection in autumn as the vector is no longer present.

LINDSTEN (K.). **Några synpunkter och iakttagelser rörande 'bollnässjukan'.** [Some points of view and observations concerning 'Bollnäs disease'.] —*Sverig. Utsädesfören. Tidskr.*, **71**, 1, pp. 53–73, 4 fig., 1961. [Engl. summ.]

Symptoms of this disease, which seriously affects cereals, especially oats, in S. Norrland, Värmland, and Dalarna, Sweden [**39**, 166], include dwarfing, profuse stooling, and low grain yield. At least 3 viruses (I, IIa, and IIb) occur on cereals in the areas under observation; IIb produces effects very similar to those regarded as typical of Bollnäs disease. Virus I is transmissible by *Rhopalosiphum padi* and *Macrosiphum granarium* [*M. avenae*] and the disease caused by it is believed to be identical with [barley] yellow dwarf.

Field studies in 1959 yielded no direct evidence of a relationship between the frequency of *Calligypona* [*Delphacodes*] *pellucida* [loc. cit.] and Bollnäs disease, unless the vector were carrying IIb, as in 1 field where production of oats was very poor and some 90% of the leafhoppers were infective. The results of experiments in which viruliferous individuals were confined in insect cages confirmed the suspected association with virus IIb.

In varietal reaction trials barley proved remarkably tolerant, whereas all the oats were severely damaged, though 6 out of 21 vars. gave some indication of comparative resistance.

Until the cause of the disease has been definitely established (nutrient deficiency is excluded on the basis of soil and plant analyses), the only control measure to be recommended is a temporary reduction in the cultivation of oats and the substitution of the less susceptible barley, wheat, and rye.

MCGREGOR (A. J.), SCHOFIELD-PARKER (E. K.), & WILSON (G. C. S.). **Placement of manganese sulphate for control of manganese deficiency in Oats.**—*Fertil. Feed St. J.*, **53**, 8, pp. 313–317, 319, 3 fig., 1 graph, 1960.

In field trials during 1954–58 on several farms in Lanarkshire, Scotland, $MnSO_4$ was mixed with the fertilizer and applied at seeding at 56 lb. acre or sprayed at 2% (100 gal./acre) or broadcast at 56 lb. as soon as the 1st symptoms of deficiency appeared. Responses to the 1st two were significant, with increased yields of approx. 6 and 3 cwt./acre. Satisfactory control has actually been effected with as little as 20 lb. commercial $MnSO_4$/acre. Mn deficiency may be expected to occur where the soil pH is above 6·3 with a resultant fall in the Mn conc. of the plants to 20 p.p.m. or below.

IKENBERRY (G. J.) & YOUNG (H. C.). **A leaf blight of Cimarron Oats.**—*Phytopathology*, **51**, 2, pp. 80–83, 3 fig., 1961.

This var. and its derivatives are susceptible to this disease 'Cimarron blight', which was shown at Okla State Univ. to be a genetically controlled physiological breakdown of leaf tissue, susceptibility being recessive. Symptoms were not observed before the seedlings were 9 weeks old and were most severe in the autumn-sown crop.

ANCALMO (O.) & DAVIS (W. C.). **Achaparramiento (Corn stunt).**—*Plant Dis. Reptr*, **45**, 4, p. 281, 1961.

The Dirección Gen. Invest. agron. and the U.S. Operations Mission, Santa Tecla, record the 1st occurrence of maize stunt virus [**40**, 300] in El Salvador (Pacific coastal area) in 1959. In addition to Maramorosch's 2 types [**35**, 602] of symptom and a combination of these, there was a 3rd, transmitted by *Dalbulus maydis*, everywhere present, namely a fine stipple striping of the leaves, the chlorotic spots

remaining discrete, with no stunting. Sweet corn is more susceptible (up to 100% infection) than commercial maize.

Kalinin (M. S.). Сорта и гибриды Кукурузы. [Maize varieties and hybrids.]—127 pp., 60 col. pl., Moscow, Min. Agric. U.S.S.R., 1958. Roubles 15.

This album contains illustrations of the cobs of 24 regional maize hybrids, 1 hybrid population, and 35 regional vars., with notes on their agronomy, including resistance to fungus diseases. The hybrids VIR 42 and Krasnodarskiĭ 5 have very high resistance to blister smut [*Ustilago maydis*: **40**, 358], that of VIR 22, 50, and 63 being high.

Iłłakowicz (A.). **Z badań nad gatunkami grzybów z rodzaju Fusarium występujących na ziarnach Kukurydzy (z lat 1956-57).** [A study on species of the genus *Fusarium* noted on Maize grain in 1956–7.]—*Prace nauk. Inst. Ochr. Rośl.*, **1**, 3, pp. 135–162, 1959. [Abs. in *Referat. Zh. Biol.*, *1961*, 5, Sect. G, p. 75, 1961.]

At the Inst. for Plant Prot., Reguły, Poland, untreated maize seed was sown in sterile sand and monospore cultures were made of the fungi developing. Unripe ears were inoculated with cultures and the seedlings grown from infected seed examined. *F. nivale* var. *majus* [*Calonectria nivalis*], noted for the first time on maize in Poland, was highly pathogenic. Other isolates included *F. moniliforme* [*Gibberella fujikuroi*], *F. poae*, and *F. solani* and its f. *redolens* [cf. **40**, 301].

Bailey (A. G.) & Van Eijnatten (C.). **Corn gray spot caused by Piricularia grisea.**—*Phytopathology*, **51**, 3, pp. 197–198, 2 fig., 1961.

In 1959 and 1960 maize in the greenhouse and field at Ibadan, W. Nigeria, was severely infected by *P. grisea*, not previously recorded on this host in nature [cf. **26**, 316]. Field plants bore round-oval leaf spots up to 5×8 mm., pale tan with a light brown margin, often a chlorotic halo, and a dark grey, sporulating centre; infection was most severe on young plants. Lagos White showed some resistance.

Cheremisinov (N. A.). Склеротиниоз Кукурузы. [Sclerotiniosis of Maize.] –Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 4, pp. 25–26, 2 fig., 1961.

Sclerotinia libertiana [*S. sclerotiorum*: cf. **15**, 1], reported from Voronezh region, U.S.S.R., formed light brown slimy spots on stems, on which white mycelium developed, causing them to rot, with subsequent formation of black sclerotia. The infection of cobs was less frequent and on field crops often latent; in storage the affected grains lost lustre and developed mycelium. The intensity of the disease increased with air and soil humidity. Control should include destruction of infected plants, cultivation to 25–30 cm. depth, crop rotation, selection of seed material, and the drying of cobs before storage.

Maloul (I. M.). **Physiological studies of species of Helminthosporium parasitic on Corn.**—*Diss. Abstr.*, **21**, 5, p. 1017, 1960.

At Purdue Univ., Ind., lactose stimulated sporulation of *H. turcicum* and *H. carbonum* on maize [cf. **39**, 699] more than any single carbohydrate, but sorbose+glucose increased it in *H. turcicum* more than lactose. Not all isolates sporulated best with the same N source. The results indicate that the C source used in the medium may determine which N source is utilized most effectively in spore production. The amount and rate of growth may determine to a large extent the factors favouring sporulation.

Rentería M. (O. J.). **Biología del Sogata orizicola Muir vector de la hoja blanca del Arroz.** [The biology of *S. orizicola*, vector of hoja blanca of Rice.] –*Acta agron., Palmira*, **10**, 1, pp. 71–100, 6 fig., 1960. [Engl. summ. 35 ref.]

This study of the life cycle and distribution of *S. orizicola* [**39**, 469 and below]

gives some additional host plants of this vector, including maize, sugarcane, wheat, lucerne, sunflower, *Ricinus communis*, and 6 grass spp.

McGuire (J. U.), McMillan (W. W.), & Lamey (H. A.). **Hoja blanca disease of Rice and its insect vector.**—*Rice J.*, **63**, 13, pp. 15-16, 20–24, 28, 1960. [34 ref.]

Discussing the information available, the authors state that it has been shown that the disease differs from stripe virus disease in Japan [cf. **37**, 282] in that mortality among plants attacked by hoja blanca is less than that among stripe-affected plants; in stripe disease the central leaves do not unroll upon emergence, but tend to bend downwards in the shape of a sickle. Some vars. resistant to hoja blanca have been reported to be susceptible to stripe virus, and vice versa. The hoja blanca virus has a latent period of 5 9 days in the insect vector (*Sogata orizicola*) [cf. **40**, 45] and appears to be of the persistent type. The severity of the symptoms is inversely proportional to the age of the plant at inoculation. Plants infected at the 5-leaf stage are reduced to 56% of the normal av. height. In Cuba some fields have over 90% of the stems infected and give no yield, though the somewhat resistant var. Zoyas Bazan with an estimated infection of 29% had a yield of 2,140 lb. acre: the estimated reduction of 800 lb./acre was thought to be due primarily to hoja blanca. In field tests with susceptible vars. in Cuba early infection caused losses (based on panicle wt.) ranging from 386–1,158 lb./acre.

In preliminary tests on control 6 insecticides were used against *S. orizicola* on Bluebonnet 50 rice seeded on 20 Feb. 1958. All the materials were applied by hand at weekly intervals from the time the rice was 2 weeks old, 15 applications in all. On 14 May the av. number of diseased tillers reading was: for BHC, 12; methyl demeton, 14; DDT, 15; dieldrin, 16; chlordane, 18; malathion, 22; control, 33. In cwt./acre the yields were: methyl demeton, 23·19; DDT, 19·79; malathion, 17·91; BHC, 15·32; chlordane, 14·66; dieldrin, 13·87; control, 10·75.

Templeton (G. E.). **Local infection of Rice florets by the Rice kernel smut organism, Tilletia horrida.**—*Phytopathology*, **51**, 2, pp. 130–131, 1961.

This information from the Dept Plant Path., Univ. Ark., Fayetteville, on *T.* [*Neovossia*] *horrida* has been noticed [**40**, 532].

Ōtani (Y.). **Studies on the relation between the principal components of Rice plant and its susceptibility to the blast disease and on the physiological characters of the blast fungus.**—*J. Fac. Agric. Hokkaido Univ.*, **51**, 1, pp. 1–179, 33 graphs, 1959. [129 ref.]

Details are given of exhaustive experiments on blast [*Piricularia oryzae*: cf. **40**, 84] on seedlings in the hot-bed and in the nursery, on plants at all stages, particularly in relation to N content and sugar content, and on the fungus in relation to N and C sources, var. Eiko being used throughout. Enhancement of susceptibility in such medium susceptible vars. is often linked with the accumulation in the plant of soluble N such as amino acids, which favour the growth and respiration of the fungus and increase the activity of the enzymes (amino acid oxidase or protease) produced by it.

Podhradszky (J.). **Provokatív vizsgálati módszerek Rizsfajták Piricularia-rezisztenciájának elbírálására.** [Provocative methods for the assessment of resistance in Rice varieties to *P.*]—*Növénytermelés*, **10**, 1, pp. 67–76, 8 fig., 1961. [Russ., Engl. summ.]

At Res. Inst. Plant Prot., Budapest, Hungary, rice seedlings inoculated in the glasshouse with *P. oryzae* [**40**, 413] and stored in moist chambers at 92% R.H. were classed into 4 groups, with decreasing degrees of resistance according to the size of the developing spots. Field trials included an assessment of infection in plants

sown at various periods in soil heavily fertilized with $(NH_4)_2SO_4$ and close to the susceptible var. Dunghan Shali, and in others sprayed between tillering and flowering with a spore suspension (10^5 100–150 ml. sq. m.) and covered with a molino tent. The conidia were obtained from cultures on oat agar on rice straw, and from infected barley and rice, or from rice plant debris from the previous season.

PERUMAL (S.). **Leaf-tip drying disease on Rice (Oryza sativa).**—*Soil Sci.*, **91**, 3, pp. 218–221, 1 fig., 1961.

The symptoms of a serious disorder affecting both local and imported Indian and foreign vars. in arid soils recently brought under irrigation cultivation in the Raichur District of Mysore, India, include desiccation of the leaves from the tip downwards and, in severe cases, stunting and considerable yield reduction. An analysis of the plants and soils in the Tungabhadra irrigation area, where the trouble becomes very virulent, revealed a high accumulation of Mn, soil samples yielding 9 and 40 p.p.m. and desiccated leaves up to 1,624 p.p.m. compared with 594 in healthy material. These high concs. were also found to supset the intake of the major nutrients, N and P. Remedial measures should comprise sufficient drainage to check Mn accumulation, sparing irrigation, and rotation of rice with sunflowers, which require very large quantities of Mn and consequently serve as extractants.

HALISKY (P. M.) & PETERSEN (L. J.). **Pathogenicity and systemic development of Sphacelotheca reiliana in Sorghum species.**—Abs. in *Phytopathology*, **51**, 1, p. 65, 1961.

Susceptibility to *S. reiliana* was demonstrated by field experiments in 3 vars. of Sudan grass, 2 sorgos, and 7 hybrid and 8 common grain sorghums in Calif. [**39**, 228]. Seed inoculation of Ryer 15 sorghum produced 1–2% infection compared with 15–60% from soil-borne inoculum. Seed transmission in Greenleaf Sudan grass was not prevented by seed treatments, and histological studies confirmed the systemic nature of the mycelium. The smut developed in 2 successive crop stands of susceptible vars. but in resistant or immune vars. there was no latent infection of 2nd growth tillers. Albino sori were observed on 2 plants of a hybrid sorghum in the field.

PATRICK (R.) & HILL (E. C.). **Microbiology of Citrus fruit processing.** –*Bull. Fla agric. Exp. Sta.* 618, 62 pp., 17 fig., 1 diag., 1959. [146 ref.]

This publication deals with the preparation of processed fruit, the detection of contaminating organisms, the sources and kinds of micro-organisms involved, their survival in citrus juices, and their use in the utilization of waste materials.

SALERNO (M.). **Su alcuni gravi danni in piante di Limone, con l'intervento di 'Fusarium lateritium' Nees ('Gibberella baccata' (Wallr.) Sacc.).** [On some serious injuries to Lemon plants accompanied by *F. lateritium* (*G. baccata*).] —Reprinted from *Tecn. agric.*, **11**, 4 5, 15 pp., 3 pl., 1959. [Received Apr. 1961.]

A rapid and fatal wilt of Femminello and Monachello lemon trees on sour orange which occurred locally in the spring of 1958 was studied at Univ. Catania. In May 1959 the felled trunks of dead trees were found to have large, depressed areas, in which the bark was cracked and bore reddish fungal fructifications. The roots showed mechanical injuries, the wood underneath some of which was brown and rotting. The fungus [cf. **37**, 202], occurring on cracks at the base of the trunk, was frequently associated with injuries spreading upwards from the roots. *G. baccata* was isolated from large branches cut away earlier and left lying. Deep cultivation in Dec. 1957 and injury from cold in the ensuing winter probably predisposed the trees to infection.

KLOTZ (L. J.) & DEWOLFE (T. A.). **Limitations of the hot water immersion treatment for the control of Phytophthora brown rot of Lemons. Brown rot contact infection of Citrus fruits prior to hot water treatment.**—*Plant Dis. Reptr*, **45**, 4, pp. 264–267, 5 fig., 1 graph; pp. 268–271, 1961.

At the Dept Plant Path., Univ. Calif., Riverside, it was found that immersion for 4 or more min. in water or treating solutions at 115–120° F. within 60 hr. of picking is necessary to control brown rot caused by *Phytophthora citrophthora* [**40**, 360], which will be more prevalent the higher the orchard temps. after winter and spring rains. Though cold fungicidal solutions will kill the pathogen in culture, heat is necessary as penetration will have already taken place. Data of temps. within the rind are given. Slight wilting of cold turgid lemons before immersion is desirable, to avoid oil injury of the rind.

The second paper presents data showing the extent of zoospore infection of oranges and lemons by contact during harvesting before treatment, and stresses that the rind surface must be slightly dried before hot water treatment. Details of treatment are given. Addition of 0·5% strong soap solution will emulsify any rind oil released and prevent it corroding the fruit surface.

MAJORANA (G.). **Sintomi di carenza di rame accertati sperimentalmente su piante di Arancio dolce (Citrus sinensis Linn.) e Mandarino (C. reticulata Blanco), in Provincia di Catania.** [The symptoms of copper deficiency confirmed experimentally in Sweet Orange and Mandarin plants in the Province of Catania.]—Reprinted from *Tecn. agric.*, **12**, 6, 19 pp., 6 fig., 1960. [Engl. summ. 23 ref.]

The author (Ist. Pat. veg., Univ. Catania, Sicily), describes fully a condition of sweet orange and mandarin trees which was shown (by injections) to be due to Cu deficiency [cf. **34**, 225], apparently reported for the 1st time on fruit trees in Italy. Recognized control methods are outlined.

MAIER (C. R.). **In-the-furrow application of soil fungicides for control of Cotton seedling diseases.**—*Plant Dis. Reptr*, **45**, 4, pp. 276–280, 1961.

Tests on irrigated cotton by the N. Mex. Agric. Exp. Sta., Univ. Park, showed quintozene alone or +captan, captan+phaltan, and thiram (arasan or tersan 70) to be the most effective of 17 chemicals tested, and low-volume spraying to be more effective than in-the-furrow or planter-box dusting, in controlling a disease complex including *Rhizoctonia* [*Corticium*] *solani*, *Thielaviopsis basicola*, and *Fusarium* spp. [cf. **39**, 106]. Data are presented showing returns on in-the-furrow application to be 6–10 times as great as application costs through disease loss reduction, stand and yield increases, earlier maturity, and healthier plants.

BLANK (L. M.). **Preliminary studies on control of south-western Cotton rust.**—*Plant Dis. Reptr*, **45**, 4, pp. 241–243, 1961. [10 ref.]

In fungicide tests, 1958–1960, at the U.S. Dept Agric. and Univ. Ariz., Tempe, zineb (65% W.P.) at 2 lb./40 gal. water/acre was very effective as a foliage spray before infection by rust [*Puccinia cacabata*: **39**, 470].

SOUSA MELO (J. M.), CABRAL (A.), & QUINTANILHA (LUCIA). **Processos de conservação da semente de Algodão e sua influência na faculdade germinativa.** [Ways of storing Cotton seed and their influence on viability.]—*Bol. Soc. Estud. Moçambique*, **29**, 124, 14 pp., 2 graphs, 1960.

This paper reports a series of tests at the Maniquenique Exp. Sta., Mozambique, on the storage of non-delinted cotton seed in flasks ¼ filled with quicklime. Treatment with ceresan or BHC before storage did not promote viability after a 60-month storage period—there was, in fact, a sharp drop between 20–40 months.

Vitgeft (A. E.). Антагонистическое действие актиномицетов на возбудителей вилта Хлопчатника. [The antagonistic action of actinomycetes against the causal agents of Cotton wilt.] –Антибиотики [*Antibiotiki*], **5**, 6, pp. 111–113, 1960. [Engl. summ.]

Of 2,721 actinomycete cultures isolated at the Inst. Soil Sci., Tadzhik Acad. Sci., from serozems under cotton and lucerne in the Hissar valley, 611 (22·5%) were antagonistic to *Verticillium dahliae* [**40**, 107] and 122 (10·4%) of 1,171 were antagonistic to *Fusarium* [*oxysporum* f.] *vasinfectum* [**39**, 25]. Specifically antagonistic were *Actinomyces* [*Streptomyces*] *violaceus*, *A.* [*S.*] *globisporus*, *A.* [*S.*] *griseus*, and *A.* [*S.*] *albus*. The sporangiophores of 4 of the strs. were verticillate, and by their morphological, cultural, and biochemical characters should be attributed to *A. biverticillatus*.

Borisov (G. N.). Итоги сортоиспытания Хлопчатника за 1960 год. [Results of testing Cotton varieties for 1960.]—Хлопководство [*Khlopkovodstvo*], **11**, 3, pp. 47–55, 5 fig., 1961.

Among the 114 lines in the Soviet collection tested on 83 State var. plots was the long-staple S-6022 (2296 × 2352) bred at the Inst. for Selection and Seed Breeding, Uzbek Acad. agric. Sci., with high resistance to *Fusarium* wilt [*F. oxysporum* f. *vasinfectum*: cf. **40**, 468 and above]; also resistant were I-37 (2963-I × 7631-I), from the Turkmen sci. Res. Inst. for Agric., and vars. 9078-I, S-6015, 5172-V, and 5769-V, which have been tested for several years.

Falcão De Campos (A. C. G.). **Algumas notas sobre a bacteriose dos Algodoeiros em Moçambique.** [Some notes on the bacterial blight of Cotton plants in Mozambique.]—*Bol. Soc. Estud. Moçambique*, **29**, 124, 18 pp., 8 fig., 1960. [Engl. summ. 29 ref.]

This paper deals with blackarm (*Xanthomonas malvacearum*) [cf. **39**, 414; **40**, 308], which has recently caused severe losses in Mozambique. Symptoms, spread, and control are described from the Exp. Stas. Maniquenique and Mutuáli; severity of attacks is said to depend on climatic conditions. Control measures are compulsory fallow years during which remains of crop years are destroyed; seed treatment with Hg dusts, chiefly agrosan 5 W at 1 150 w w; and the planting of resistant vars., A 637 being the most promising so far.

Schober (E. J.) & Kluge (E.). **Über die Bedeutung, Verbreitung und Bekämpfung einiger wichtiger saatgutübertragbarer Leinkrankheiten.** [On the significance, spread, and control of some important Flax diseases transmitted by seed.] —*NachrBl. dtsch. PflSchDienst, Berl.*, N.F. **14**, 9, pp. 184–190, 1 graph, 1960. [Russ., Engl. summ.]

In E. Germany *Colletotrichum lini* [*C. linicola*], *Polyspora lini* [**40**, 170], and *Phoma* sp. are the commonest of these pathogens [cf. **38**, 209]. At the Zuchtstation des volkseigenen Saatzuchtgutes, Berthelsdorf, Krs. Löbau, the health of the seed was shown to be important in determining spread. Warm, wet weather during growth aided spread of the first 2 diseases; the 3rd is promoted by high soil moisture and thick sowing. Thiram was the best seed dressing; captan failed to control *Phoma* sp. Sowing of insufficiently treated seed led to high crop losses.

Kerr (H. B.). **The inheritance of resistance of Linum usitatissimum L. to the Australian Melampsora lini (Pers.) Lév. race complex.**—*Proc. Linn. Soc. N.S.W.*, **85**, 3 (394), pp. 273–321, 1960.

This further study at Sydney Univ. [cf. **39**, 107] supplements Flor's identification of resistance factors in flax vars. [cf. **35**, 892; **40**, 48] and confirms the basic division of the Australian *M. lini* complex into Punjab-attacking and non-Punjab-attacking

races, emphasizing its relative avirulence (restricted host-range virulence). Three-way-cross material used in the studies helped to establish the existence of only 2 allelic series in the linked N series identified by Flor.

Sarkar (A.). **Studies on the anthracnose fungus of Hibiscus cannabinus L.**—*Lloydia*, **23**, 4, pp. 97–101, 1960.

In culture experiments at the State agric. Res. Inst., Calcutta, the mycelium of *Colletotrichum hibisci* [cf. **39**, 108] grew best on Richards's agar, a medium containing 5% dextrose, and asparagine, and the spores developed best on glucose peptone agar, asparagine, and a basal medium with 1% KNO_3. Opt. temp. for growth and spore germination was ca. 32° C.

Martin (A. L. D.). **Breeding Flax for Aster yellows resistance.**—*Proc. ent. Soc. Manitoba*, **15**, pp. 30–32, 1959.

At the Cereal Breeding Lab., Canada Dept Agric. Res. Sta., Winnipeg, plants of 20 flax vars. from the World Collection were caged when 4–6 in. high with viruliferous leafhoppers [*Macrosteles fascifrons*] (15–20/pot), which were allowed to feed for about 5 days and then released. After 10–14 days symptoms of aster yellows virus [**38**, 385] appeared on almost all plants. The few without symptoms were grown to maturity and the next generation plants tested in the same manner. After 5 generations of such selection only occasional plants developed symptoms.

Sharma (O. P.). **Oidiopsis taurica (Lév.) Salmon on some new hosts in Madhya Pradesh.**—*Sci. & Cult.*, **27**, 1, p. 39, 1961.

A note from the Agric. Res. Inst., Gwalior, India, on the occurrence of *O.* [*Leveillula*] *taurica* on *Linaria*, *Delphinium*, *Tropaeolum*, and *Phlox* spp.

Baker (K. F.), Dimock (A. W.), & Davis (L. H.). **Cause and prevention of the rapid spread of the Ascochyta disease of Chrysanthemum.**—*Phytopathology*, **51**, 2, pp. 96–101, 5 fig., 1961. [16 ref.]

A discussion of the recent literature is supplemented by new data on *Mycosphaerella ligulicola* [cf. **39**, 585] from N.Y., Fla, and Calif. Ray blight may be controlled by using disease-free stock produced at a distance from any commercial plantings under conditions of strict hygiene. All infected material should be destroyed, cuttings sprayed with ferbam, maneb, or zineb [**40**, 310], and overhead watering avoided.

Lavyts'ka (Mme Z. H.). Випадок знебарвлення спороношень **Camarosporium laburni (West.) Sacc.** [A case of etiolation of the pycnidia of *Cucurbitaria laburni*.]—*J. Bot. Acad. Sci. Ukr.*, **17**, 2, p. 109, 1960.

During studies of the fungus flora of green plantations in the Transcarpathian region by the Shevchenko State Univ. many overgrown, crowded *Laburnum anagyroides* plants at the Vinogradov nursery gardens in May 1957 were found bearing numerous pycnidia of *C. laburni* [cf. **7**, 426] on dead branches. On one of the branches, among the mass of *C.* pycnidia, was an islet of pale fruit bodies with hyaline conidia of the *Hyalothyridium* type identical with those of *C.*, except for the pallidity. Many of the conidia, especially towards the centre of the islet, were deformed. At the periphery there was a change from dark to hyaline both in the conidia and pycnidial walls. Such pycnidia had developed in complete darkness, being covered by fallen leaves. They indisputably belonged to *C. laburni*, the normal development of which had been checked by absence of light.

Zolotarev (A. I.). Повышение устойчивости семенного Люпина к серой гнили. [Increase of resistance in seed Lupin to grey rot.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 3, p. 47, 1961.

The measures advocated by the Lab. Phytopath., All-Union Inst. Plant Prot.,

against grey rot [*Botrytis cinerea*: cf. **39**, 76] of lupin are: chequered sowing to ensure sufficient access of light, the use of PK fertilizers, and some other agrotechnical measures. Shading of lupin shoots for 3, 5, and 10 days resulted in 28, 52, and 100% infection, respectively.

Montant (C.). **Comparaison du métabolisme azoté entre les feuilles de Rhododendron ferrugineum L. saines et attaquées par Exobasidium rhododendri Cram. et Eriophyes alpestris Nal.** [Comparison of the nitrogen metabolism in healthy leaves of *R. ferrugineum* and those attacked by *E. rhododendri* and *E. alpestris*.]—*C.R. Soc. Biol., Paris*, **154**, 5, pp. 1104–1107, 2 graphs, 1960.

At the Faculté des Sciences, Toulouse, France, analysis revealed that the dry wt. (as % of fresh wt.) of healthy leaves was 39·7 and those infected by *E. rhododendri* [*E. ? azaleae* or *E. ? vaccinii*: **36**, 764: **40**, 472] 12·4, the total N contents were 3·6 and 0·9, and the soluble N 0·41 and 0·7, respectively. Of particular interest in connexion with the relative proportions of amino acids is the ratio of glutamic: aspartic. Using the + sign to indicate the amounts on the same chromatogram, aspartic acid is represented by 3 in healthy and 4 in diseased foliage, the corresponding figures for glutamic being 4 and 5.

Jackson (C. R.). **Cercospora leafspot of Statice.**—*Phytopathology*, **51**, 2, pp. 129–130, 2 fig., 1961.

Heavy infection of *Limonium sinuatum* and *L. bonduellii* by *C. insulana* in commercial plantings in Fla sometimes causes defoliation and the death of immature panicles. Lesions are first 0·5–1 mm. in diam., dull red to orange, later expanding with a tan, membranous centre up to 15 mm. diam. and a narrow reddish-brown or orange margin. Spores, produced on both surfaces, are 58·325 (90) × 2·6·5·8 (3) μ with 2·24 (8) septa. In inoculation experiments at the Gulf Coast Exp. Sta., Bradenton, the disease was reproduced on both spp. The max. lesions/leaf on *L. sinuatum* was obtained at 16° C. in the range 12·28°. *In vitro* mycelial growth was max. at 28°.

Richter (W.) & Schneider (Roswitha). **Grasnarbenschäden durch Corticium fuciforme (Berk.) Wakef. in Nordwestdeutschland.** [Turf damage caused by *C. fuciforme* in N.W. Germany.] —*NachrBl. dtsch. PflSchDienst, Stuttgart*, **13**, 4, pp. 54–59, 2 fig., 1961. [Engl. summ.]

An outbreak of this disease was 1st noted in Germany in 1960 at Esens, Lower Saxony, in pastures on sandy fen soil which had not been grazed in the wet 1960, were insufficiently fertilized, and still showed signs of the 1959 drought. *Festuca rubra* and *Agrostis tenuis* were infected the most severely, *Lolium perenne* rather less.

Hardison (J. R.). **Evidence against Fusarium poae and Siteroptes graminum as causal agents of silver top of Grasses.**—*Mycologia*, **51** (*1959*), 5, pp. 712–728, [1961. 42 ref.]

From further studies at Oregon agric. Exp. Sta., Corvallis, evidence is presented that in Oregon silver top is not caused by *F. poae* in association with the vector *S. graminum* [cf. **37**, 527]. The condition was controlled by DDT and is attributed primarily to insects, mostly thrips.

Gould (C. J.), Goss (R. L.), & Eglitis (M.). **Ophiobolus patch disease of turf in Western Washington.**—*Plant Dis. Reptr*, **45**, 4, pp. 296–297, 2 fig., 1961.

The symptoms [cf. **35**, 611], and the causal fungus, which fits the description of *Ophiobolus graminis* var. *avenae* [**20**, 159], are described from W. Wash. Exp. Sta., Puyallup. The disease appeared after a mild winter and very wet spring, and was more prevalent on *Agrostis* putting greens than on adjoining *Festuca* turf.

KAUFMANN (M. J.), DROLSOM (P. N.), & NIELSEN (E. L.). **Reaction of Smooth Bromegrass to seedling pathogens.**—*Agron. J.*, **53**, 2, pp. 77–80, 1961.

At Crops Res. Div. U.S. Dept Agric. and Wis. agric. Exp. Sta., Madison, seedlings of 6 vars. and 8 experimental synthetics of *Bromus inermis* grown *in vitro* in 4 non-sterilized soil types at 26–28° C. were predominantly affected by post-emergence blight, from which *Pythium graminicola* [**39**, 419], *Helminthosporium sativum* [*Cochliobolus sativus*], *Curvularia geniculata*, *Fusarium roseum*, *F. oxysporum*, and *Pyrenochaeta terrestris* were isolated. Inoculation of 2 vars. in sterile silica with *Pythium graminicola* and *Cochliobolus sativus* severely reduced emergence, and *F. roseum* caused some reduction; the other organisms had little effect. Pure culture inoculation of 10 vars., 10 synthetics, and 1 bulk lot with *P. graminicola* and *C. sativus* revealed repeatable differences in reaction to infection among the seedlings and reduced stands considerably by pre-emergence killing. The var. Saratoga and 4 synthetics were significantly more tolerant of the pathogens than other strs.

HANSON (E. W.) & HAGEDORN (D. J.). **Viruses of Red Clover in Wisconsin.**—*Agron. J.*, **53**, 2, pp. 63–67, 12 fig., 1961. [34 ref.]

These further studies [cf. **32**, 383] by Crops Res. Div. U.S. Dept Agric. and Wis. agric. Exp. Sta., Madison, suggested that the symptoms of each investigated virus alone, though useful, are inadequate for diagnoses and that the use of differential hosts and sometimes of the physical properties of the viruses are requisite for identification. The reactions of 10 red clover clones to red clover vein mosaic, bean yellow mosaic, Wisconsin pea streak, and lucerne mosaic viruses, which are described in general, were very varied. Some clones were highly resistant.

SERGEEV (P. A.), SHAIN (S. S.), KONSTANTINOVA (Mme A. M.), GERASIMOVA (Mme A. I.), MINYAEVA (Mme O. M.), & FEDOSEEV (B. V.). Культура красного Клевера. [Red Clover Growing.]—542 pp., illustr., Moscow, Sel'khozgiz, 1958. Roubles 9.50.

In a sect. on diseases (pp. 487–515) pathogens, symptoms, and control are briefly described. Particularly widespread are *Botrytis anthophila* [**40**, 173], which can be very serious in years favourable to infection; *Pseudopeziza trifolii*; *Ascochyta trifolii*, especially in the N.; *Polythrincium* [*Cymadothea*] *trifolii*, noted on several clover spp., though in the Moscow region red clover is not often infected, white being more susceptible; and *Pseudomonas radiciperda* [**11**, 652] in the Chernigov, Moscow, Volýnskaya, and Lower Volga regions.

KILPATRICK (R. A.). **Floral infection of Ladino white Clover, incited by Curvularia trifolii.**—*Plant Dis. Reptr*, **45**, 4, pp. 286–287, 2 fig., 1961.

This disease [**38**, 149] was experimentally induced *in vitro* at the agric. Exp. Sta., Durham, N. Hamp., and flowers of all ages were found susceptible. Symptoms are chlorosis of flower parts, wilting, death of petioles and flowers, and, in severe cases, failure to develop seed.

ZUB (J.). **Nowy dla Polski gatunek grzyba : Coniothyrium minitans Campb., nadpasożyt raka Koniczynowego (Sclerotinia trifoliorum Erikss.).** [A fungus species new to Poland, *C. minitans*, a hyperparasite of Clover rot (*S. trifoliorum*).]—*Biul. Inst. Ochr. Roś., Poznań, 1960*, 9, pp. 171–180, 1960. [Russ., Engl. summ. Cyclostyled.]

The str. of *C. minitans* [cf. **37**, 296] isolated from *S. trifoliorum* spores in 2 localities in the Olsztyn region differed from the standard English str. [loc. cit.] by its larger pycnidia and the lack of mycelial pigment. It attacked the sclerotia as well as the mycelium of the host fungus and showed resistance to some antagonistic forms of soil microflora. The author suggests the possibility of its utilization for biological control of clover rot.

McDonald (W. C.). **A comparison of ascospore carriers for inoculating Alfalfa with Pseudoplea trifolii.**—*Phytopathology*, **51**, 4, pp. 261–262, 1961.

Lucerne seedlings were successfully inoculated in the greenhouse at the Res. Sta., Winnipeg, Man., with ascospores of *P. trifolii* collected in oil or glycerol from inverted, perithecial cultures on V-8 juice agar [**37**, 365].

Cormack (M. W.). **Longevity of the bacterial wilt organism in Alfalfa hay, pod debris, and seed.**—*Phytopathology*, **51**, 4, pp. 260–261, 1961.

In further studies at the Plant Path. Lab., Lethbridge, Alta [**37**, 102], *Corynebacterium insidiosum* retained a high degree of viability (determined by inoculating healthy plants) throughout 10 yr. of storage in dried lucerne stems at 70–80° F.; infective capacity in leaf and pod material was lower; in 2 seed samples the bacterium was still highly infective after 3 yr.

Crang (Alice) & Clarke (G. M.). **Effects of some fungicides on the flavour of fruits and syrups.** *J. Sci. Fd Agric.*, *1961*, 3, pp. 227–234, 1961.

At Long Ashton Res. Sta., Bristol, it was found [cf. **35**, 307] that 5 p.p.m. captan increased the corrosion rate in cans and caused some taint in syrups, though this was not detectable before processing; sprayed on strawberries it slightly tainted fresh or canned fruit in 2 of 5 yearly tests. Thiram at 2 p.p.m. had similar effects, though not on bottled syrups, and caused very noticeable taint during 5 yr., especially after canning. Karathane at 10 p.p.m. caused no corrosion or taint in a 1 yr. trial on gooseberries and strawberries.

Chen (Y.-H.), Liu (F.-C.), & Chiang (K.-C.). **List of names of fruit tree diseases in North East China.**—*Zhibing zhishi*, **2**, 2, pp. 102–108, 1958. [Chin.]

Following a chronological survey of the literature on plant diseases in N.E. China [cf. **16**, 840], a list is given of 165 diseases (50 on apple, 11 on *Malus baccata*, 24 on pear, 14 on vine, 5 on *Vitis amurensis*, 11 on apricot, 11 on peach, 10 on *Prunus salicina*, 5 on *Crataegus pinnatifida*, 6 on cherry, 3 on *P. tomentosa*, 4 on *Zizyphus vulgaris*, 6 on *Rubus* spp., 2 on red currant, and 3 on *Corylus heterophylla*), including 78 newly reported. The severity of each disease is also indicated. Included are *Agrobacterium tumefaciens* [map 137] on apple, pear, vine, and plum, *Xanthomonas pruni* [map 340] on apricot, and peach, and *Polystigma rubrum* [map 148] on *Prunus salicina*. This data was collected by the authors from 1950 onwards, supplemented by a survey in 1955 by the Res. Inst. for fungal diseases of plants, Acad. Sci., with the participation of groups from the Peking Univ. Agric., the Hingcheng hort. exp. Sta., and the N.E. Bureau of Inspection for produce and manufactures.

Grosclaude (C.). **Le plomb des arbres fruitiers.** [Silver leaf disease of fruit trees.] —*Ann. Épiphyt.*, **11**, 3, pp. 397–417, 4 fig., 1960. [81 ref.]

A full account (based largely on the literature) from the Centre de Recherches agronomiques du Sud-Ouest, Pont de la Maye, France, including symptoms, possible causes, hosts of *Stereum purpureum* [**38**, 217], geographical distribution, anatomical features and their origin, spread, and control.

Cation (D.). **A comparison of virus isolates, dwarf-fruit and Spy 227-lethal.** – *Phytopathology*, **51**, 2, pp. 104–106, 4 fig., 1961.

In further work at Mich. agric. Exp. Sta. [**40**, 368], bud and graft inoculation with the Spy 227-lethal [**40**, 175] and dwarf fruit viruses caused stem pitting on Hyslop apple, chlorotic leaf spot and leaf distortion on the R 12740–7A indicator, and leaf mottling on Spy 227, while the only difference between the isolates was the less drastic effect of the lethal virus on Hyslop fruit. Neither virus produced symptoms of mosaic or rubbery wood on Lord Lambourne. Both appeared to spread by natural root grafts.

Zaleski (K.), Grela (T.), & Miciński (B.). **Doświadczenia porównawcze nad zwalczaniem parcha Jabłoniowego (Venturia inaequalis (Cooke) Aderh.) i mączniaka Jabłoniowego (Podosphaera leucotricha (E. et E.) Salm.) za pomocą pełnoprogramowych opryskiwań preparatami miedziowymi i siarkowymi z lat 1951–1953.** [Comparative experiments on the control of Apple scab (*V. inaequalis*) and mildew (*P. leucotricha*) by full-schedule spraying with copper and sulphur compounds in 1951–1953.] –*Biul. Inst. Ochr. Roś., Poznań, 1960*, 10, pp. 203–234, 1960. [Russ., Engl. summ. 18 ref. Cyclostyled.]

Of 8 compounds and combinations applied to the leaves and fruits of the susceptible Landsberg Reinette apple 6 times during the season the following gave effective control of scab [**40**, 231]: 1% Bordeaux mixture before flowering and 2% lime-sulphur after; 2% lime-sulphur throughout; 0·75% bordosol; 2% lime-sulphur (5 sprays) and 1 at pink-bud of 1% Bordeaux; and 1·5% lime-sulphur. For mildew the order of efficiency was 2, 1, 4, 5, and 2% lime-sulphur (5 sprays)—Bordeaux mixture at calyx fall.

Khristo (A.). Новые сорта Яблони для Новосибирской области. [New Apple varieties for the Novosibirsk region.]—*Сел. Хоз. Сибири* [*Sel. Khoz. Sibiri*], **6**, 3, pp. 52–54, 1961.

A short list is presented from the Novosibirsk Berry-fruit exp. Sta. of apple vars. resistant to scab [*Venturia inaequalis*: **39**, 593] suitable for cultivation locally, namely, the summer vars. Sibinskaya krasavitsa, Kal'vil belyĭ letnyĭ, and Mal't Bagaevskiĭ; the autumn vars. Sipan Michurina and Antonovka novaya; and the winter vars. King of the Pippins and Pippin litovskiĭ. The summer and autumn vars. are suitable for all districts of the region.

Gambrell (F. L.) & Gilmer (R. L.). **The influence of insecticide-fungicide spray programs on the growth of Apple nursery trees.** –*J. econ. Ent.*, **53**. 5, pp. 717–719, 1960.

During 1956–58 4 bi-weekly combined insecticidal and fungicidal treatments considerably increased the vigour and quality of 4 vars. at N.Y. St. agric. Exp. Sta., Cornell Univ., Geneva. The insecticides were lindane, demeton, and malathion, and the fungicides S, Cu-S-lime, and karathane for the control of apple mildew (*Podosphaera leucotricha*). S (5 lb./100 gal.) was the most effective fungicide and it greatly improved leaf colour and general appearance of the trees. Karathane (22·5%) at $\frac{3}{4}$ lb./100 gal. also gave good control of mildew but caused marginal injury and mottling of the leaves. Of the 4 vars., Monroe benefited the most from the treatments, being highly susceptible to mildew and of relatively low vigour. Golden Delicious, of medium vigour, also responded favourably, while even the robust McIntosh and Idared were noticeably improved.

Csorba (Z.). **Almafák kombinált vegyszeres növényvédelme.** [Combined chemical control of diseases of Apple.] –*Kísérletügyi Közl.*, **C 52**, 2, pp. 103–109, 1959. [Russ., Germ. summ. Abs. in *Referat. Zh. Biol.*, *1961*, 5, Sect. G, p. 79, 1961.]

At the Budapest Inst. of Plant Prot., an iso mixture of $FeSO_4$ + mavepon and the preparations cosan and sulfex A were highly effective against powdery mildew [*Podosphaera leucotricha*: **36**, 251; cf. **40**, 231] and non-injurious to the trees. Three sprays are recommended between budding and flowering.

Ottová-Svobodová (Vlasta). **Poznámky k biologii houby Venturia inaequalis (Cooke) Winter ve vztahu k boji proti strupovitosti Jabloní.** [Remarks on the biology of the fungus *V. inaequalis* in relation to the control of Apple scab.]—*Čes. Mykol.*, **15**, 2, pp. 86–93, 6 graphs, 1961. [Germ. summ.]

A collation of data from Prague Univ. bot. Garden, Komárov near Hořovice, and

Mělník, Czechoslovakia, showed that discharge of *V. inaequalis* ascospores [cf. **40**, 230] starts approx. at the beginning of Apr. and reaches its max. in early May, and that it takes place chiefly within ½–1 hr. after rain. The danger of infection with ascospores ceases towards the end of May or in June. Control should be based on forecast.

Weber (Anna). **Gloeosporiumsår i Aebletraeer.** [*Gloeosporium* injury in Apple trees.]—Reprinted from *Månedsovers. plantepat. Forsog Kbh.* 382, 4 pp., 4 fig., 1960.

Infection by *G. perennans* [*Pezicula malicorticis*] and *G. album* [*P. alba*] on apple trees (as distinct from the fruits) is stated to be comparatively rare in Denmark, but a survey of 6 orchards in July 1960, following heavy attacks on the fruit in 1958–9, revealed quite a fair number of injuries on the branches, caused primarily by the former sp. [**38**, 151]. The surface of the wounds is even, with none of the fissures round the site of infection typical of other fruit tree cankers, and there is a characteristically sharp line of demarcation between healthy and diseased tissue. The small protuberances within the wounds burst when the fungi mature, disclosing a pale yellow-brown or whitish-grey, slightly waxen powder composed of conidiophores and conidia, surrounded by an irregular margin of ruptured bark. The elimination of such cortical injuries as may be detected will not prevent subsequent attacks on the fruit, since the total exclusion of all foci of infection by this means would be impracticable. The discovery of the pathogens at this stage, however, emphasizes the need for special care in spraying, with no unduly long intervals in damp weather, and continuing right up to the time of picking. Decay due to *P.* spp. is an important source of loss in storage, not least in Cox's Orange.

Schmidle (A.). **Über einen Befall der Apfelunterlage EM IX durch Phytophthora cactorum.** [Concerning an attack on Apple rootstock EM IX by *P. cactorum*.] —*NachrBl. dtsch. PflSchDienst, Stuttgart.* **13**, 4, pp. 59–60, 1 fig., 1961.

This infection, reported from the Inst. für Obstkrankheiten, Heidelberg, noticed in June 1960 on stocks grafted with Cox's Orange, was a crown rot [cf. **35**, 685] rather than a collar rot. The EM IX stock is generally regarded as highly resistant [**36**, 474; **38**, 265].

Denmead (C. F.), Vere-Jones (N. W.). & Atkinson (J. D.). **A commercial method of controlling Apple scald with diphenylamine emulsions.** —*J. hort. Sci.*, **36**, 2, pp. 73–84, 1 pl., 4 graphs, 1961.

Details are given from the Dominion Lab., and the Fruit Res. Div., D.S.I.R., N.Z., of the protection of apples, loose-packed in bushel cases, from superficial scald by drenching with oil-water emulsions containing diphenylamine (DPA) [**40**, 477]. A conc. emulsion, generally 10% w. v. DPA in Shell 'Octaro' oil+10% v./v. Shell 'Nonidet P. 80' spreader, emulsified with an equal vol. of water, was diluted for use, generally 1:25, giving approx. 0·2% DPA. A water drench was followed by the emulsion drench of 1–10 min., followed by drainage for ½ min. and then a further water drench. Predictable levels of DPA were obtained by varying the duration of drenches. Different apple vars. differed by more than tenfold in DPA uptake for the same treatment, and the rate of loss of DPA at any time from the surface of the apple was proportional to the DPA conc. at that time. With Granny Smith apples in 1 case after 6 months cold storage, 100% protection from scald was obtained; there was some protection with similar oil-water emulsions without DPA. Apples held at ambient temp. for 6 days between harvesting and treatment were less susceptible to scald than those held in cold store for a similar period. There appeared to be a possible correlation between scald susceptibility and DPA uptake for a given treatment.

Salerno (M.). **Il 'mosaico' del Pero in Sicilia.** [Pear mosaic in Sicily.]—*Tecn. agric.*, **9**, 5, pp. 372–376, 2 fig., 1957. [Received Apr. 1961.]

The author (Univ. Catania) describes the symptoms of pear ring pattern mosaic [cf. **36**, 597; **38**, 217; **39**, 477], found on var. Butirra d'estate in 1955 but probably long present in Sicily. It was transmitted to healthy Decana d'inverno by grafting.

Batjer (L. P.), Degman (E. S.), & Benson (N. R.). **Pear decline trends in Washington orchards.**

Woodbridge (C. G.) & Blodgett (E. C.). **Further observations on Pear decline in Washington with particular emphasis on quick decline.**—*Plant Dis. Reptr*, **45**, 4, pp. 255–257, 1 graph; pp. 258–259, 1961.

The pattern of pear decline development [**40**, 548] on an individual tree basis was determined in 30 Wash. orchards near Yakima and Wenatchee from 1956 to 1960 [**40**, 369]. Trees on oriental rootstocks were more susceptible than those on domestic seedlings or imported French, the latter, however, being less resistant than the domestic, though trees on both these stocks improved during the survey. The effect of rootstocks was similar on both older and 2–3-yr.-old trees.

The second paper reviews the results of annual autumn surveys of entire orchards or blocks of trees since 1956 in the Yakima Valley [cf. **37**, 47].

Anzin (B. N.), Enikeev (Kh. K.), & Rozhkov (M. I.). Слива. [The Plum.]—460 pp., illustr., Moscow, Sel'khozgiz, 1956. Roubles 8.15.

In a sect. on diseases and pests fungus diseases are briefly considered (pp. 380–386), followed by a description of controls suitable for the central regions and the southern fruit-growing zone (pp. 396–399). Included are white fruit rot or 'monilial burn' [*Sclerotinia* sp.: **40**, 175] which under Sochi conditions most frequently infects early vars. and does not attack branches and flowers; leaf spot caused by various [unspecified] fungi, occurring everywhere to varying extents; shot hole [*Clasterosporium carpophilum*: **40**, 157], most frequent in the S.; rust [*Tranzschelia pruni-spinosae*], everywhere present; and white root rot [*Rosellinia necatrix*] mainly in the S. on badly drained soils.

KenKnight (G.). **Epidemiology of peach rosette virus in Prunus angustifolia.**—*Plant Dis. Reptr*, **45**, 4, pp. 304–305, 1961.

This virus [**39**, 598] was shown at U.S. Dept Agric., Fort Valley, Ga, to spread in thickets of *P. angustifolia*, after graft inoculation of isolated individual trees, through underground stolon roots and also above ground by an unknown vector.

Weintraub (M.). **Purification and electron microscopy of the Peach yellow bud mosaic virus.**—*Phytopathology*, **51**, 3, pp. 198–200, 2 fig., 1961.

During a visit to the Virus Lab., Berkeley, Calif., preparations of the virus [**39**, 722] were obtained from infected cowpea leaves and cotyledons by the butanol-chloroform method [**35**, 637]. Infectious material contained spherical particles 45–50 mμ diam.

Chella (G.). **Gli Albicoccheti vesuviani minacciati da una grave malattia.** [The Apricot plantations on Vesuvius threatened by a serious disease.]—*Progr. agric.*, **7**, 3, pp. 356–360, 1 pl., 3 fig., 1961.

During the past 5 yr., *Sclerotinia laxa*, favoured by the prevailing weather conditions, has caused serious losses of apricots growing on the slopes of Vesuvius. Trials at the Osservatorio Fitopatologico, Portici, showed that infection can be prevented by spraying after leaf-fall in autumn and before flowering in spring

with 2·5% Bordeaux mixture or 0·5–0·6% ziram [cf. **37**, 18, 394] with 2 or more further sprayings (with 0·3% zineb) and another at fruit set; when the weather conditions favour infection 10 sprayings/yr. may be necessary.

Hutton (K. E.). **Two common diseases of Mulberries.**—*Agric. Gaz. N.S.W.*, **72**, 1, pp. 44–46, 2 fig., 1961.

Symptoms and disease development of leaf spot (*Septogloeum mori*) [**29**, 517] and bacterial blight (*Pseudomonas mori*) [**39**, 248] in N.S.W. are described, also control measures (phytosanitation and spraying with Bordeaux mixture).

Cappellini (R. A.), Stretch (A. W.), & Walton (G. S.). **Effects of sulfur dioxide on the reduction of postharvest decay of Latham Red Raspberries.** —*Plant Dis. Reptr*, **45**, 4, pp. 301–303, 1 fig., 1961.

This decay, caused by *Botrytis* and *Cladosporium* spp., was effectively controlled with SO_2 at Dept Plant Path., Rutgers State Univ., New Brunswick, N.J. Berries were exposed to single and multiple doses for 20-min. periods at 80–85° F., then stored at 50–80° for 2–7 days. Initial fumigations were made ca. 4 hr. after harvest, further ones 24, 48, or 72 hr. later. Slight softening and bleaching of berries developed after treatment with 0·5% SO_2; delayed ripening at 0·25% and 0·13% was not thought injurious, nor were off-flavours detected.

Wilhelm (S.). **Diseases of Strawberry—a guide for the commercial grower.** —*Circ. Calif. agric. Ext. Serv.* 494, 26 pp., 15 col. pl., 10 fig., 1961.

All diseases found in the State and their control are described from Berkeley Exp. Sta., Calif., and arranged under root and crown, virus, foliage, and fruit diseases, the most serious being *Verticillium alboatrum* [**39**, 725] wilt, red stele (*Phytophthora fragariae*) [map 62], at present restricted to the coastal growing areas, a fruit deformity, 'cat face', associated with an undetermined fungus that attacks stigmatic surfaces, and *Botrytis cinerea* rot. Diseases discussed earlier for California are black root rot [*Idriella lunata*: **36**, 771] and aster yellows virus disease [**39**, 725]. Also mentioned are *Pythium ultimum*, *Rhizophagus*, and *Rhizoctonia* [*Corticium*] *solani*, additional agents of black root rot, the last also causing bud and crown rot; *Armillaria mellea* and *Rosellinia necatrix*, both causing root and crown rot; *Mycosphaerella fragariae* leaf spot, controlled by furrow irrigation; *Gnomonia fructicola*, present but not associated with leaf blotch; *Sphaerotheca humuli* [cf. **37**, 294]; the virus diseases yellows and crinkle; and also June yellows and tip burn. The remainder are relatively rare.

Müller (H. W. K.). **Zur Bekämpfung des Grauschimmels Botrytis cinerea Pers. an Erdbeeren.** [Control of grey mould *B. cinerea* on Strawberries.]—*NachrBl. dtsch. PflSchDienst, Stuttgart*, **13**, 5, pp. 65–68, 2 fig., 1961.

After further spraying tests at the Staatsinstitut für Angewandte Botanik, Pflanzenschutzamt, Hamburg [**39**, 430], the author recommends spraying with thiram at 5 kg. ha. [cf. **40**, 58] at the beginning and end of flowering (to avoid spoiling fruit flavour) with a 3-nozzle spray boom to reach all sources of spores down to the soil around the plant.

Sil'vestrov (A. D.). Известь против серой гнили Земляники. [Lime against grey mould of Strawberry.]—*Защ. Раст., Москва* [*Zashch. Rast., Moskva*], **6**, 5, p. 33, 1961.

At Leningrad agric. Inst., U.S.S.R., treatment of the lower parts of strawberry plants and adjacent soil with slaked lime at 800–900 kg./ha. (or 15–20 g./bush) at the beginning of fruit formation and at ripening reduced incidence of grey mould [*Botrytis cinerea*] from 30–40 to 3–4%; there were no phytotoxic effects.

Smith (H. C.) & Newhook (F. J.). **Dryberry of Boysenberries caused by downy mildew.**—*Orchard., N.Z.*, **34**, 3, pp. 79–81, 1 fig., 1961.

At the Plant Dis. Div., Lincoln and Auckland, this disease, hitherto of uncertain origin [cf. **38**, 532], has been shown to be caused by *Peronospora rubi*. Infected berries shrivel, immature fruit turning prematurely reddish and becoming dull if ripening, though sometimes only a part of the berry is infected. The central plug of the berry soon begins to dry, often causing splitting. Stalks of infected trusses darken and sepal tips 'scorch'. Control recommended is lime sulphur 1:25 at bud movement, 1:40 a week later, and then together with colloidal S every 10–14 days until Nov., followed by colloidal S + captan (1:1·5:100) at the same intervals 3–4 times in Nov.–Dec.

Holmes (R. S.). **Effect of phosphorus and pH on iron chlorosis of the Blueberry in water culture.** –*Soil Sci.*, **90**, 6, pp. 374–379, 2 fig., 1 graph, 1960.

At the Mineral Nutrition Lab., U.S. Dept Agric., Beltsville, Md, rooted cuttings of high-bush blueberry (*Vaccinium corymbosum*) var. Rancocas were grown with levels of P from 1 to 60 p.p.m. at pH 4, and at pH levels of 4–8 with P constant at 20. During the later growth stages an Fe chelate, FeEDDHA, replaced inorganic Fe in all solutions [cf. **35**, 378].

At min. P at pH 4 P deficiency symptoms, expressed by a purple discoloration of the tips and edges of the older bottom leaves and a reduction in size of ¼, developed: incipient Fe chlorosis appeared in the younger foliage at max. P. The best growth was at pH 4 and 5, higher levels increasing the severity of Fe chlorosis. FeEDDHA eliminated chlorosis and promoted continued growth, flowering, and ripe berry production.

Booth (C.). **'Black cross', a newly recorded disease of Bananas.** –*Commonw. phytopath. News*, **7**, 2, p. 23, 1 fig., 1961.

During the past 4 yr. banana leaves in New Guinea, Papua, New Britain, Bougainville, and Fiji have been collected with characteristic cruciform lesions caused by the growth of a *Phyllachora* sp. forming a black stroma about 6 cm. long on a main lateral vein with 2 shorter arms 0·5–0·75 cm. on either side. Fertile material exudes white masses of ascospores.

Salerno (M.). **Rilievi epidemiologici sull'occhio de pavone' dell'Olivo (Cycloconium oleaginum Cast.) in Sicilia.** [Investigations on the epidemiology of 'peacock's eye' of the Olive (*C. oleaginum*) in Sicily.]—Reprinted from *Tecn. agric.*, **12**, 6, 19 pp., 4 graphs, 1960. [Engl. summ. 30 ref.]

Studies at Univ. Catania on 10 trees of the highly susceptible Moresca var. from Dec. 1958–Mar. 1960 are described [**40**, 320, 421, and below]. In E. Sicily there are 2 main periods of infection, in autumn and in spring [cf. **39**, 607], often not clearly separated. The incubation period is 10 days at the end of summer, av. temp. 23–24° C. [cf. **36**, 39]. Infection occurs from 6–8° to 25°.

Bonifacio (Annarosa) & Gudin (C.). **Un metodo di diagnosi delle infezioni da Cyclonium oleaginum Cast.** [A method of diagnosing infections caused by *C. oleaginum*.]—*Riv. Pat. veg., Pavia*, Sér. 3, **1**, 2, pp. 107–113, 1 pl., 1961. [25 ref.]

At Univ. Florence infection of olive leaves by *C. oleaginum* when the fungus was still in the incubation stage [**40**, 373] and invisible macroscopically was detected by exposure of the leaves to Wood's light, spots of blue fluorescence appearing in the infected areas and contrasting with the dark violet of the rest of the leaf. The test was as rapid as the chemical one [**38**, 484], but rather less sensitive. Sensitivity

was increased by treating the leaves with various chemicals before exposure, the best results being given by ammonia vapour.

The dark spots which form in the infection centres in the leaves after immersion in KOH or NaOH [loc. cit.] are believed to be due to reaction with metabolic substances resulting from fungus-host reaction. Uninfected leaves wounded or with drops of 0·1% $HgCl_2$ on the surface did not fluoresce.

Plenet (A.). **La lutte contre les principaux ennemis du Manguier à la Réunion.** [Control of the principal enemies of the Mango tree in Réunion.]—*Rev. agric. Réunion*, N.S., **60**, pp. 267–278, 7 fig., 1960.

In the sect. dealing with fungus diseases [cf. **40**, 60] brief, popular notes are given on the local distribution, symptoms, and control of anthracnose (*Colletotrichum gloeosporioides*) [*Glomerella cingulata*: cf. **39**, 120, 727], powdery mildew (*Oidium mangiferae*) [cf. **37**, 204 *et passim*], and sooty mould associated with various fungi.

Skotland (C. B.). **Infection of Hop crowns and roots by Pseudoperonospora humuli and its relation to crown and root rot and overwintering of the pathogen.**—*Phytopathology*, **51**, 4, pp. 241–244, 5 fig., 1961.

At Wash. agric. Exp. Sta., Pullman, systemic infection was found in all the underground parts of hop plants from the Yakima Valley, where crown and root die-out had recently become serious. Some infected crowns died, while others lived for several yr. Root symptoms included a reddish brown discoloration and brown necrotic spotting in the parenchyma of the cortex, xylem, phloem, and pith; mycelium and haustoria were found in these tissues.

The mycelium overwintering in the crown invades new shoots, inducing the development of basal spikes [**40**, 374] on which sporangia are produced. When new shoots become secondarily infected the fungus spreads then systemically in the crown. Oospores were found only once (in a basal spike) and appear unimportant in overwintering of the mildew locally.

Stachyra (T.). **Choroby degeneracyjne Chmielu w Polsce.** [Degeneration diseases of Hops in Poland.]—*Prace Inst. Ochr. Rośl. Poznań*, **1**, 3, pp. 95–133, 1959. [Abs. in *Referat. Zh. Biol., 1961*, 7, Sect. G, p. 79, 1961.]

Of the virus diseases of hops observed in 1951–57, the most important economically were sterility [hop nettle head virus], leaf curl [? str. of hop nettle virus: cf. **40**, 373], 'box-like roll', and early maturity.

Ablakatova (Mme A. A.). Фузариозное увядание всходов Лиммошка. [Fusariosis wilt of Schizandra shoots.] Сообщ. дальневост. Фил. Сиб. Отдел. Акад. Наук СССР [*Soobshch. dal'nevost. Fil. Sib. Otdel. Akad. Nauk S.S.S.R.*], *1959*, 11, pp. 83–85, 1959. [Abs. in *Referat. Zh. Biol., 1961*, 8, Sect. G, p. 80, 1961.]

A shoot wilt of *Schizandra*, first detected in 1955 at the Mountain-taiga Sta., Far Eastern Branch, Acad. Sci. U.S.S.R., was caused by a new form, *Fusarium sporotrichioides* f. *schizandrae* [**40**, 81].

Adamczyk (Krystyna). **Wstępne badania nad bakteriozą Kolendry.** [Introductory studies on the bacteriosis of Coriander.] *Biul. Inst. Ochr. Rośl., Poznań, 1960*, 9, pp. 181–203, 8 fig., 1960. [Russ., Engl. summ. Cyclostyled.]

Plants from untreated coriander seed from the Establishment of Herbs, Bydgoszcz, Poland, and from Czechoslovakia and Yugoslavia, sown in field soil developed, respectively, 14·1, 46·3, and 63·3% bacteriosis (caused probably by *Xanthomonas translucens*); in Bydgoszcz seed treated with fungitox OR before sowing in pots of sterilized sand it was 4–30%. Of various treatments, 0·4% formalin, 0·1% panogen, 0·1% Hg sublimate, and dry hot air at 53° C. for 30 min. gave the best control.

Treatment with hot water or dry hot air, both at 53° for 30 min., or fungitox OR increased germination by 35, 30, and 12%, respectively. Inoculum from infected plant debris kept in a refrigerator at —18° for 7½ months was highly virulent, but that from debris buried in natural soil for the same period was only slightly so.

Downey (R. K.) & Bolton (J. L.). **Production of Rape in Western Canada.**—*Publ. Dep. Agric. Can.* 1021, 19 pp., 4 fig., 1961.

The section (pp. 12–15) on diseases (Res. Sta., Saskatoon, Sask.), gives brief descriptions of the following diseases, not at present serious, with suggestions for control: stem blight (*Sclerotinia sclerotiorum*) [cf. **39**, 515], white rust (*Albugo cruciferarum*) [*A. candida*], downy mildew (*Peronospora parasitica*), grey or black leaf spot (*Alternaria brassicae*) [**39**, 334], ring spot or black blight (*Mycosphaerella brassicicola*) [**39**, 752], root rot (*Fusarium* spp.), and aster yellows virus, causing pod distortion.

Orellana (R. G.). **Leaf spot of Sesame caused by Cylindrosporium sesami.**—*Phytopathology*, **51**, 2, pp. 89–92, 6 fig., 1 graph, 1961.

This disease is severe in Fla and S. Carol. and is a new record for the U.S.A. Seed-borne sclerotia apparently initiated the 1958 outbreak at Fla Exp. Sta., Gainesville, the disease being disseminated during the growing season by air-borne conidia. Opt. temp. for growth of the fungus was 27° C.±2°, min. 16°, max. 33°; it was pathogenic to sesame and soybean but not to tobacco or castor bean [*Ricinus communis*]. About 20 lines of sesame from the world collection were moderately resistant.

Petrlík (Z.) & Štys (Z.). **Organické fungicidy v provozu.** [Organic fungicides in practice.]—*Chmelařství*, **33**, 2, p. 22, 1960. [Abs. in *Referat. Zh. Biol.*, *1961*, 9, Sect. G, p. 78, 1961.]

Novozir-N and novozir-L [**40**, 18] were tested at the Hop-growing sci. Res. Inst., Žatec, Czechoslovakia, against peronosporosis [*Pseudoperonospora humuli*: **40**, 422]. As these preparations are somewhat less effective than cupricol, they are recommended for spraying at the cone stage in years when the infection is mild.

Prasad (N.), Mathur (R. L.), & Agnihotri (J. P.). **Blight of Fennel in Rajasthan. I. Morphology and identity of the pathogen.**—*Curr. Sci.*, **30**, 2, pp. 65–66, 2 fig., 1961.

The authors (Dept Agric., Rajasthan, Udaipur), suggest that the fungus associated with blight of *Foeniculum vulgare*, previously [**38**, 416] identified as *Cercospora foeniculi* can best be accommodated in *Ramularia*, as it differs from *Cercospora* in not having long filiform or vermicular, 3- or more celled conidia and compares favourably with *R. foeniculi* [**12**, 244].

Varkey (T.) & Davis (T. A.). **Studies on Coconut pollen with reference to the leaf and root (wilt) diseases.**—*Indian Cocon. J.*, **14**, 1, pp. 1–7, 1960. [16 ref.]

In further work [cf. **39**, 334, 436] at the Central Coconut Res. Sta., Kayangulam, male flowers from healthy coconut palms and from those infected by root (wilt) [cf. **40**, 375] and leaf diseases in the initial, middle, and acute stages of infection (6 palms in each category) were studied. Pollen from infected palms was smaller than from healthy, with a max. of diminutive and irregular shaped grains where infection was acute, but normal grains capable of germination, and presumably fertilization, were found in male flowers, though sometimes only a few due to the exhaustion of the tree from infection. The percentage of dummy pollen was higher in infected palms, with a correlation between this and the development of infection, and in root (wilt) infected palms than leaf infected ones at the same stage. The percentage of pollen germination declines as the disease develops.

Gondek (J.). **Czy stołbur Ziemniaczany w Polsce?** [Is there Potato stolbur in Poland?]—*Zesz. nauk. wyższ. Szkol. roln. Kraków*, **7**, 10, pp. 183–198, 1960. [Engl., Russ. summ. Abs. in *Referat. Zh. Biol., 1961*, 9. Sect. G, p. 76, 1961.]

When studying virus infection in potato plantings in 1946–49 a peculiar disease was noted. Characteristic symptoms were reduction of the stem, the formation of lateral shoots from the leaf axils, and of aerial tubers on the stems. These and other symptoms resembled those of [tomato] stolbur virus [cf. **40**, 121]. Plants developed from tubers and tubercles were infected. The disease may be intermediate in type between northern and southern tomato stolbur viruses.

Wenzl (H.). **Die Testung von Kartoffelsaatgut.** [The testing of seed Potatoes.]—*Pflanzenarzt*, **13**, 9, pp. 91–92, 94, 1960.

A description from the Bundesanstalt für Pflanzenschutz, Vienna, of the various methods used in Austria for testing for virus infection.

Gol'din (M. I.) & Eliseeva (Mme Z. N.). Вирусные заболевания Картофеля. [Virus diseases of Potato.]—Вестн. Акад. Наук Казах. ССР [*Vestn. Akad. Nauk Kazakh. S.S.R.*], **17**, 1, pp. 95–97, 1961.

The need for improving the production and use of seed potatoes in the mountain regions of the Uzbek, Kirghiz, and Georgian S.S.R. was recorded in the 1959–65 plan.

M. I. Gol'din & Mme Z. N. Mikenicheva [**39**, 1] showed in 1957 that mountain planting for 2 yr. did not free potatoes from virus diseases. In 4-yr. plantings at 1,830 m. in fertile mountain chernozems (planting 20–30 May) virus diseases were assessed on 400–500 haulms for each var. at the beginning of flowering in July and at the beginning of Aug. Externally healthy plants were tested for potato viruses X [**40**, 424] and Y by the indicator and serological drop methods. At the end of the period tubers were not free from virus Y or virus S [str. of potato paracrinkle virus]. At 1,830 m. not only does the virus increase but it spreads. Virus-free 'seed' must therefore be used in the mountains and in isolation from virus-infected plants.

Reĭfman (V. G.). Распространение вируса L и вируса X на Картофеле в Приморском крае. [The distribution of virus L and virus X in Potato in the Primorskiĭ kraĭ.]—Изв. Сибир. Отдел. Акад. Наук СССР [*Izv. Sibir. Otdel. Akad. Nauk S.S.S.R.*], *1960*, 12, pp. 101–113, 6 fig., 1960.

The wide distribution of potato leaf curl virus [cf. **39**, 33] and virus X [cf. above] in Primor'e, necessitating immediate control, is reported from the Far Eastern Branch, Acad. Sci. U.S.S.R. The latent form of virus X was established by indicators and serologically on all vars. tested, the most resistant being Paul Wagner. Much of the crop contained healthy plants so that virus-free stocks of the local vars. can be developed.

Goth (R. W.) & Wilcoxson (R. D.). **Red Clover : a new host for Potato virus X.** —*Phytopathology*, **51**, 2, pp. 132–133, 1961.

At Minn. agric. Exp. Sta., St. Paul, Wegener red clover plants mechanically inoculated with the ring spot str. of virus X [**40**, 180] from potato developed a diffuse mottle and slight veinal chlorosis after 6 weeks. The virus was sap transmitted back to potato.

Graham (K. M.), Dionne (L. A.), & Hodgson (W. A.). **Mutability of Phytophthora infestans on blight-resistant selections of Potato and Tomato.**—*Phytopathology*, **51**, 4, pp. 264–265, 1961.

A note on this work at Fredericton, N.B., Canada, has appeared [**39**, 535]. The fungus was also cultured on senescent leaves of resistant potato and tomato vars. [**40**, 381].

Sokolova (Mme V. E.), Savel'eva (Mme O. N.), & Solov'eva (Mme G. A.). О токсичности кофейной и хинной кислоты по отношению к грибу **Phytophthora infestans.** [On the toxicity of caffeic and quinic acids to *P. infestans*.] —*C.R. Acad. Sci. U.S.S.R.*, **136**, 3, pp. 723–726, 1961.

In further work at the A.N. Bach Inst. Biochem., Acad. Sci. U.S.S.R. [**39**, 614 and below] addition of quinic acid at 1 or 2 mg./ml. to the oat agar medium considerably enhanced growth whereas caffeic acid at 0·5–2 mg./ml. was inhibitory, the highest conc. reducing mycelial wt. by over 50%. Losses of the acids during growth are thought to be caused by oxidation. It is concluded that the stimulating effect of chlorogenic acid on *P. infestans* is due to the quinic acid in its molecule, the caffeic acid component being responsible for the defence action in resistant potato plants.

Savel'eva (Mme O. N.) & Rubin (B. A.). К биохимии гриба **Phytophthora infestans.** [On the biochemistry of the fungus *P. infestans*.]—*C.R. Acad. Sci. U.R.S.S.*, **137**, 4, pp. 980–983, 1 fig., 1961.

The basic substance in the toxic principle isolated from *P. infestans* [cf. above] at the A.N. Bach Inst. Biochem. was polysaccharide I (over 81% of the total toxin). It was very toxic to potato leaves and had a high physiological activity.

Lapwood (D. H.). **Potato haulm resistance to Phytophthora infestans. I. Field assessment of resistance.**—*Ann. appl. Biol.*, **49**, 1, pp. 140–151, 22 graphs, 1961. [19 ref.]

A full account is given of field tests from 1956–59 at Rothamsted exp. Sta., Harpenden [cf. **40**, 3], of haulm resistance to *P. infestans* assessed in the susceptible King Edward, the moderately resistant Majestic, the susceptible Up-to-Date, and Arran Viking, considered as resistant as Majestic. 'Resistance' implies multigene or field resistance [cf. **37**, 369].

The differences between the vars., though significant (in 2 seasons only), were smaller than might have been expected from commercial experience, but could be important, prolongation of haulm growth by a single week in July or Aug. representing a potential of 1 ton tubers or more acre [cf. **28**, 301]. The differences were brought out more distinctly by individual leaf measurements than by whole plot assessments [**27**, 89].

The different lengths of time for complete blighting did not depend primarily on rate of haulm destruction, but more on initial delay of the start of the attack. This delay could be attributed in Majestic and Arran Viking to a slower rate of leaflet infection; though such a delay also occurred in King Edward in 1958 it did not retard the rate of destruction, which was as rapid as in Up-to-Date. King Edward leaves were destroyed most rapidly, those of Arran Viking least rapidly. The results suggest that resistance factors which retard early development of the blight attack are later unable to prevent the disease from becoming epidemic or to slow down the rate of defoliation.

Afanasiev (M. M.). **Occurrence of late blight disease of Potatoes in Montana.**—*Plant Dis. Reptr*, **45**, 4, p. 314, 1961.

The 1st recorded occurrence in the State, an outbreak of *Phytophthora infestans* on Norland potato in Powell County in 1959, not repeated in 1960, is reported from Mont. agric. Exp. Sta., Bozeman.

Cruz (B. P. B.). **Ocorrência de raças fisiologicas de Phytophthora infestans, agente causal de 'requeima' da Batatinha e Tomateiro no Estado de São Paulo.** [Occurrence of physiological races of *P. infestans*, causal agent of Potato and Tomato blight in the State of São Paulo.]—*Biológico*, **27**, 2, pp. 40–41, 1961.

This information has been noticed [**40**, 240].

Seidel (D.) & Bochow (H.). **Der Einfluss verschiedener Erdextrakte auf die Schwärmintensität von Synchytrium endobioticum (Schilb.) Perc.** [Effect of various soil extracts on the swarming intensity of *S. endobioticum*.]—*Naturwissenschaften*, **48**, 2, pp. 57–58, 4 graphs, 1961.

At the Inst. für Phytopath. und Pflanzenschutz, Univ. Rostock, Germany, soil extracts at various concs. tested on *S. endobioticum* warts on Deodora potato for 18–22 hr. at room temp. in comparison with distilled water inhibited the swarming of zoospores from summer sporangia. The effect of sandy soils was slight and that of compost soils considerable [cf. **3**, 477].

Mygind (H.). **Undersøgelse af jordprøver for Kartoffelbrok.** [Examination of soil samples for Potato wart.]—Reprinted from *Horticultura*, *1961*, 1, 4 pp., 3 fig., 1961.

A description is given of the construction and use of an apparatus developed at the Danish Phytopath. Exp. Sta. for the routine detection of *Synchytrium endobioticum* [cf. **40**, 242, 382] in soil samples. The machine sediments simultaneously 5 samples by rotation at 30 rev. min. for 1 hr. After $1\frac{3}{4}$ min. in an upright position and 2 min. sedimentation, 200 ml. are withdrawn. It takes a practised worker 20 min. to examine each sample, and 10 should be inspected to give reliable results. All the samples from 19 localities where the disease had been present at most 6 yr. previously (nearly all kitchen-gardens) yielded resting sporangia, of which approx. $\frac{1}{2}$ were full. The uneven distribution of the fungus over a given area led to a wide margin of error in calculation, so that the opt. number of samples 100 sq. m. cannot readily be determined, but 20 should be reckoned as near the min.

McLean (J. G.), Letourneau (D. J.), & Guthrie (J. W.). **Relation of histochemical tests for phenols to Verticillium wilt resistance of Potatoes.** *Phytopathology*, **51**, 2, pp. 84–89, 3 graphs, 1961. [15 ref.]

At the Branch Exp. Sta., Univ. Idaho, Aberdeen, the relative concs. of *o*-dihydroxy phenols, chiefly chlorogenic acid, in 12 different tissues of 6 potato vars. were determined with 10% ferric chloride [**36**, 347]. The concs. in the vascular tissue of the below ground part of the stem, stem node, stolon, tuber, and root stele were higher and remained high longer in the vars. Populair, 41956, and Great Scot, resistant to *V. alboatrum*, than in the susceptible Russet Burbank, Early Gem, and Kennebec. With advancing maturity phenols decreased more rapidly in the susceptible vars. With an artificially induced delay in maturity there was also a delay in reduction of phenolic content and in wilt incidence.

Rough screening of vars. for resistance was possible by means of the $FeCl_3$ test on the cortex of freshly harvested tubers.

Spore germination and mycelial growth of *V. alboatrum* was inhibited *in vitro* by concs. of chlorogenic acid lower than those in young, actively growing plants and in resistant plants.

Nilsson (L.). **Bekämpning av ringrötebakterier i Potatis.** [Control of ring-rot bacteria in Potato.]—*Meded. Växtskyddsanst., Stockh.*, **11**, 77, pp. 449–458, 2 fig., 1960. [Engl. summ.]

A tabulated survey is presented of a preliminary experiment in 1957 and one on a larger scale in 1959 to determine the efficiency of agrimycin [**40**, 485] in the elimination of *Corynebacterium sepedonicum* from Eva potato tubers at the Åkarp branch of the Swedish Plant Protection Inst. [**37**, 571].

Both the beneficial and the phytotoxic effects of the antibiotic were more marked on cut than on intact tubers after treating periods of $2\frac{1}{2}$ or 5 hr. The min. conc. (670 p.p.m.) exerted only a slight disinfectant action, but at 1,330 and 3,330 p.p.m.

incidence was uniformly reduced; however, the former conc. appeared to be moderately phytotoxic with 5 hr. immersion and the latter definitely so. In contrast to MacLachlan and Sutton's report [**37**, 371], soaking in water for these periods increased incidence.

In *in vitro* tests by the paper disk method bacteria isolated from agrimycin-treated tubers showed no sign of enhanced resistance to the antibiotic.

Breeding and selection : Vegetative propagation II. Pests and diseases I, II.—*Proc. natural Rubb. Res. Conf. Kuala Lumpur, 1960*, pp. 429–452, 6 fig., 1 graph; pp. 453-466, 3 fig., 1 map; pp. 468–509, 9 fig., 7 graphs, 1961. Whole vol. 53s/8, $23 (Malaya), $7.50 (U.S.A.), Fr. 37 (postage and packing extra).

E. D. C. Baptiste (R. R. Inst., Ceylon). **Breeding for high yield and disease resistance in Hevea** (pp. 430–445, 17 ref.). The selection and breeding of *Dothidella*-resistant *Hevea* clones in Brazil [**40**, 486] was reviewed in some detail. The 116 such clones imported into Ceylon (listed) are appraised for their reaction to *D. ulei* and *Phytophthora palmivora* [**39**, 344]. A combination of disease resistance with the high yield of Eastern clones by back-crossing is aimed at.

T. G. E. Hoedt (Pirelli Plantations, 'Oriboca', Belém, Brazil). **Dothidella ulei and the selection and breeding of Hevea** (pp. 446–452). The spread of *D. ulei* and its relation to climatic conditions were discussed, and also control by fungicidal spraying and the use of resistant planting material, with comparison of yields of Brazilian and Far Eastern clones.

T. S. Ramakrishnan (Rubber Board, Kottayam, Kerala State, India). **Experiments on the control of abnormal leaf fall of Hevea caused by Phytophthora palmivora in South India** (pp. 454–466, 11 ref.) This is the most serious disease of rubber in S. India [cf. **34**, 748; *et passim*] and the chief factor reducing latex yield; control is essential. Spraying the foliage with 1% Bordeaux mixture before the monsoon rains is at present the most effective general method of control, but oil-based Cu oxychloride and colloidal Cu formulations applied by a micron sprayer have given encouraging results in budded areas. Results of spraying trials are tabulated.

A. Riggenbach (R. R. Inst. Ceylon). **Recent progress in the control of the white root disease of Hevea** (pp. 468–472). This paper has been noticed [see below].

R. A. Fox (R.R. Inst. Malaya). **White root disease of Hevea brasiliensis : the identity of the pathogen** (pp. 473–482; 36 ref.). After adducing proof of the pathogenicity of the white root disease fungus [cf. **40**, 486] the author discussed its identity, placing some of the fungi mentioned in 3 groups: (1) *F. ulmarius* and *F. geotropus* (*sensu* Lowe 1957) [**37**, 339; cf. **38**, 468] the agents of a brown rot: (2) *Polyporus zonalis* (ss. Overholts, 1953; Weir, 1926), *P. rigidus* (ss. Overholts, syn. *P. undatus*, teste Overholts) [cf. **5**, 689; **33**, 450], and the author's Malayan *P. zonalis-rugulosus* complex; (3) *F. lignosus* (*sensu* Petch, 1921 [**1**, 134]), *P. lignosus* (*sensu* Weir, 1926), and the author's Malayan pathogen. Group 2 are either saprophytes or wound parasites limited to the heartwood of living trees where they produce pocket rot. *P. lignosus* (*sensu* Bose & Bakshi [**37**, 267]) by the nature of its rot should be in this group. Group 3 are parasites not requiring wounds and producing an undifferentiated white rot.

F. W. Hutchison (R. R. Inst. Malaya). **Factors affecting root disease incidence and control in replantings** (pp. 483–495, 16 ref.). Data were presented from field experiments in Malaya against root disease (*F. lignosus*, *F. noxius*, and *Ganoderma pseudoferreum*) [**40**, 427] and revised methods of control recommended. Clearing old stands by poisoning is satisfactory even in the absence of pre-planting eradication of infected trees. Treatment of stump surfaces with a cheap wood preservative reduced infection by up to 50% and should accompany stump poisoning. Routine collar inspection has no advantage over discovering the disease by leaf symptoms.

Soil disturbance should be reduced to a minimum; isolation of old stumps rather than eradication is sufficient.

R. N. Hilton (R. R. Inst. Malaya). **Sporulation of Fomes lignosus, Fomes noxius and Ganoderma pseudoferreum** (pp. 496–562). Freshly collected sporophores of *F. lignosus* enclosed in polythene bags were fastened to wooden blocks in sealed jars containing H_2SO_4 adjusted to give R.H.'s of 20–100%. Spore yields over 24 hr. ranged from 324,000 sq. cm. to none. The highest yield from humidities under 60% was 20,000 sq. cm., but there was great variation. Changes in humidity had little effect on sporulation, but for spore discharge it must remain high in the spore tubes. Drying-out occurred more rapidly at the lower humidities, but sporing ceased after 24 hr. even at high humidity.

Field studies showed that *G. pseudoferreum* takes 7–11 months to form initials after a stump thoroughly impregnated with mycelium has been moved, and a further 2 months to form a sporing sporophore. It may then continue to spore for at least 11 weeks. A *F. noxius* stump took 8 months to form initials and a further 24 days to start sporing, which continued for 4 months. A *F. lignosus* stump formed sporophore initials within a week and began sporing almost immediately; sporing ceased after 11 days from the part of the sporophore under observation but other parts continued to sporulate.

A. Newsam, K. P. John, & B. Sripathi Rao (R. R. Inst. Malaya). **Decay of Rubber wood** (pp. 503–509). A preliminary account was given of the process of decay of poisoned rubber, the conditions favouring it, and the time required. The evidence showed that it is brought about primarily by wood-rotting fungi, including *Polystictus occidentalis*, *Trametes corrugata*, *F. noxius*, *Lenzites repanda*, *G. applanatum*, and *Ustulina zonata*. A good ground cover of legume creepers creates ideal conditions for fungus development [loc. cit.].

Riggenbach (A.). **Recent progress in the control of white root disease of Hevea.** —*Quart. J. Rubb. Res. Inst. Ceylon*, **37**, 1, pp. 18–21, 1961.

As a result of laboratory and field experiments with a wide range of fungicides [cf. **40**, 62] at the Inst., and of the successful use of the product in commercial planting, tillex liquid [**38**, 335] is recommended for the control of *Fomes lignosus* [cf. above].

Host list of fungi etc. recorded in the South East Asia and Pacific Region. Saccharum officinarum—Sugarcane.—*Tech. Docum. FAO Plant Prot. Comm. S.E. Asia* 12, pp. 1–3, 1961. [Cyclostyled.]

Published by the FAO Regional Office, Bangkok, Thailand.

Pathology section.—*Proc. 10th Congr. int. Soc. Sug. Cane Tech., Hawaii, 1959*, pp. 1019–1147, 35 fig., 2 diag., 7 graphs, 1960.

This sect. [cf. **38**, 32] opened with papers outlining quarantine methods in Hawaii (pp. 1021–1024), Java (pp. 1024–1025), Madagascar (pp. 1025–1026), Mauritius (pp. 1026–1028), N.S.W. and Fiji (pp. 1028–1029), the Philippines (pp. 1029–1030), Queensland (pp. 1030–1031), S. Africa (p. 1032), Formosa (Taiwan) (pp. 1032–1033), and U.S.A. (1034–1042). R. Antoine gave (pp. 1042–1045) the results of further study of the tetrazolium test for detecting ratoon stunting virus [**37**, 373]. G. O. Ocfemia & F. L. Nuque briefly described (pp. 1045–1046) tests in which gibberellin stimulated the growth of sugarcane plants affected by Fiji disease virus. J. P. Martin & C. A. Wismer gave an account (pp. 1046–1050) of 2 hitherto unrecorded leaf disorders in Hawaii. In 'leaf stipple' [cf. **12**, 788] the youngest leaves were pale green with very fine chlorotic markings, giving a minute, pin-striping effect, becoming more distinct (1–3×0·5–1 mm.) and accompanied by necrosis as the leaves matured. All the leaves were progressively more chlorotic with age. The condition is thought to be genetical. 'Ring mosaic' was characterized by elongated

concentric rings, up to 36×6 mm., usually with pale green centres surrounded by chlorotic tissue, but sometimes the reverse. The markings occurred on unrolled leaves, and especially on and adjacent to the lower surfaces of the midribs, and were transmitted with cuttings, but the cause of the disorder has not yet been established.

Evidence was presented by Y. E. Azab, P. J. Mills, & S. J. P. Chilton (pp. 1050–1053) showing that recovery from mosaic virus, after inoculation of seedlings, often took place in plant cane and 1st ratoons. R. J. Steib & I. L. Forbes dealt (pp. 1053–1061) with the effects of controlling ratoon stunting virus on the yields of sugarcane in Louisiana [**38**, 225; **40**, 245], and R. J. Steib & S. J. P. Chilton (pp. 1061–1068) with the control and rate of increase of the disease in hot-air treated sugarcane [**38**, 277]. C. A. Schexnayder described (pp. 1068–1072) the use of a sugarcane 'test plant' to detect the presence of ratoon stunting virus. Inoculated cuttings of the highly susceptible C.P. 36–105 are grown in conditions of low fertility, low water, and restricted root development and examined for nodal discoloration 10–12 weeks later. H.-T. Chu, K.-C. Ling, & S.-M. Lee dealt (pp. 1072–1077) with ratoon stunting virus control in Taiwan. A paper by the late E. Artschwager (pp. 1077–1083) gave the results of a study of sieve-tube lignification and its significance in relation to ratoon stunting; in affected canes lignification of the wall and content may be partial or complete, involving all the sieve-tubes or only a few. F. S. Navarrete reported (pp. 1083–1091) on ratoon stunting at San Cristobal (Veracruz) Sugarcane Sta., Mexico, where rats [cf. **35**, 549] are considered an important factor in disease spread.

R. Antoine recorded (pp. 1091–1097) studies in Mauritius on chlorotic streak [virus] disease [cf. **40**, 428 and below]. T.-L. Chu, L.-S. Leu, & Y.-S. Bai presented a progress report on a study at Taiwan Sug. Exp. Sta. of the mode of resistance in *Saccharum* and its relatives to downy mildew (*Sclerospora sacchari*); 700 vars. were tested in 4 yr. of consecutive trials; those of *Saccharum sinense* and *S. barberi* were more resistant as a group than vars. of *S. officinarum* and *S. robustum*. All vars. of *S. spontaneum* tested were highly resistant. Maize vars. were very susceptible. L.-S. Leu & T.-L. Chu presented evidence (pp. 1129–1133) that conidia of *Sclerospora sacchari* [cf. **25**, 278] from inoculated maize were as pathogenic to sugarcane as conidia produced on the latter host.

A further revised list of sugarcane diseases and their world distribution [cf. **36**, 275] was presented (pp. 1107–1126) by the Standing Committee on Sugarcane Diseases, under the chairmanship of J. P. Martin; part III tabulates the diseases under causal agents.

Y. E. Azab & S. J. P. Chilton presented (pp. 1127–1129) the results of studies at La State Univ. on the inheritance of reaction to red rot (*Physalospora* [*Glomerella*] *tucumanensis*); the differing degrees of resistance of the parents made little difference to the percentage of resistant seedlings obtained from the crosses. C. A. Wismer's (pp. 1133–1137) work on *Pythium graminicola* has been noticed [**40**, 486].

P. E. Robinson (Colonial Sugar Refining Co., Ltd., Sydney) gave an account (pp. 1137–1147) of 'false floral smut' of sugarcane, 1st noted at Macknade Exp. Sta., N. Qd, in 1955, and caused mainly by *Claviceps purpurea* [cf. **38**, 33] followed by *Cerebella* [*Epicoccum*] *andropogonis* [cf. **28**, 545]. The 1st symptoms are a stickiness and drooping of the arrow when spikelet blooming is most active; the inflorescence rapidly turns black. Periods of high humidity are essential for infection. Observations indicated that only vars. related to *Saccharum spontaneum* are susceptible.

Antoine (R.). **Cane diseases.**—*Rep. Sug. Ind. Res. Inst. Mauritius, 1960*, pp. 58–65, 2 pl. (9 fig.), 2 graphs, 1961.

This report [cf. **39**, 733] notes that leaf scald (*Xanthomonas albilineans*) [cf. **38**, 625]

attacked M. 81/52, the seedling M. 216/55 in a 1st selection trial, the breeding cane H. 37/1933, and M. 112/34 grown on a limited scale in the sub-humid area; the last, though susceptible in British Guiana, had hitherto been regarded as resistant in Mauritius. The Barbados vars., including B. 34104, which is highly susceptible in British Guiana and Madagascar, were not attacked.

Although plants from cuttings infected by [sugarcane] chlorotic streak [virus: cf. above] lost the symptoms after growing for a time in areas where the disease does not appear, investigations showed that the pathogen might exist in a latent form in the underground parts of the plant.

The germination capacity of cuttings given heat treatment against sugarcane ratoon stunting virus [**39**, 345] depended on the var., being reduced most in Ebène 1/37 and least in B. 37172, and on the part of the stem from which they had been taken, decreasing from top to bottom. Cuttings from the upper third of the stalk after removal of the immature top were the most viable.

Comparative studies are being made of *X. vasculorum* strs. from Réunion, Madagascar, Mauritius, and S. Rhodesia (the last being assumed to be the same as the one from Natal) on vars. D. 109, M. 147/44, N: Co. 310, Louzier, B. 34104, and R. 397. Varietal resistance to [sugarcane] Fiji disease [virus: **40**, 428] is being tested in Madagascar.

Dunckelman (P. A.) & Todd (E. H.). **Comparison of flowering of healthy and RSD-infected Sugarcane.** *Sug. J., N. Orleans*, **23**, 5, pp. 28–30, 1960.

A brief survey of the literature is followed by a report on experiments at Canal Point, Fla, in the autumn of 1958, to determine the comparative abundance of flowering in 9 vars. of healthy (progeny of long hot water treatment) and ratoon stunting virus-infected sugarcane. Flowering of diseased C.P. 29/320 on lakeshore sand and 2 types of muck, one relatively warm and the other cooler, was significantly more profuse than in healthy cane. Infected and healthy C.P. 44–155 and F. 36–819 varied in flowering on the different soils, while there were no material disparities between the 2 groups in vars. Cl. 41–223, C.P. 48–103, C.P. 50–28, C.P. 52–68, C.P. 53–18, and N.Co. 310.

Hughes (C. G.). **Striate mosaic : a new disease of Sugarcane.**—*Nature, Lond.*, **190**, 4773, pp. 366–367, 1961.

Symptoms of this disease, found on Pindar and Q. 57 in the Lower Burdekin, N. Qd, are described from the Bureau of Sugar Exp. Stas., Brisbane: short, fine, just discernible striations on young, expanding leaves, mostly away from the large vascular bundles, and scarcely to be seen on older leaves, are lighter than the normal leaf colour; they sometimes cause yellowing of the tip; severe stunting is a usual accompaniment, except sometimes in Pindar. As the infection spreads very slowly in the field, the use of disease-free planting material should prevent serious losses. Treatments of the setts with hot water (50° C. for 3 hr.) or hot air (54° for 16 hr.) [cf. **39**, 344] failed to eliminate infection. Inoculations of healthy setts were negative, but striations alone or with stunting were transmitted by the Sein technique [**9**, 678]. Two viruses, one causing striations and the other stunting, are considered to cause the disease. [A brief note also appears in *Cane Gr. quart. Bull.*, **24**, 4, p. 142, 1961.]

Singh (V. B.) & Singh (K.). **Formation of red rot acervuli on the nodes and within the tissues of diseased canes.**—*Curr. Sci.*, **30**, 2, pp. 63–64, 1 fig., 1961.

Acervulus development in *Colletotrichum falcatum* [*Glomerella tucumanensis*: **40**, 487], almost entirely confined to the root primordia of inoculated sugarcane, and the production of pink spore masses within the diseased stalks are reported from the Indian Inst. of Sugarcane Res., Lucknow. It is thought likely that spores are

formed within the canes only after the stalks have dried and become almost completely hollow.

Hughes (C. G.). **Leaf scald disease in Queensland.**—*Proc. Qd Soc. Sug. Cane Tech., 1961*, pp. 123–127, 1 fig., 1961.

A useful account of the symptoms of sugarcane leaf scald [*Xanthomonas albilineans*: **40**, 428 *et passim*], with recommended control measures, presented at the 28th Conference, Apr. 1961.

Venkata Ram (C. S.). **Application of nickel chloride to Tea plants (Camellia sinensis) and control of blister blight.**—*Curr. Sci.*, **30**, 2, pp. 57–58, 2 graphs, 1961.

Perenox (50% Cu) and Ni chloride hexahydrate (25% Ni) [cf. **39**, 565] were sprayed at 6 oz./15 gal. water/acre at 7-day intervals, soon after plucking, at the Tea Exp. Sta., Devarshola, S. India, to control *Exobasidium vexans* [**40**, 183]. Infection in the plots treated with Cu was 8–13% higher than in those treated with Ni. In other plots which were allowed to develop very heavy infection applications were at 6 and 3 oz./acre, respectively; an av. initial infection of 84% was reduced to 24 and 13% in Ni treated plots after 3 and 5 weekly applications, respectively, whereas Cu oxychloride failed to give similar control. It would appear that Ni in a conc. $\frac{1}{4}$ of that of Cu gives far superior control.

Semal (J.). **Action des acides sur le nombre de lésions locales formées par le virus de la mosaïque du Tabac.** [The action of acids on the number of local lesions formed by Tobacco mosaic virus.]—*Parasitica*, **17**, 1, pp. 29–37, 4 graphs, 1961. [Engl. summ. 16 ref.]

At the Inst. Agronomique, Gembloux, Belgium, it was found that acid solutions, when mixed with TMV and rubbed on the leaves of *Nicotiana glutinosa* and *Phaseolus vulgaris*, decreased the number of local lesions, mainly on the inoculated leaves. With several mineral and organic acids a correlation was apparent between the level of inhibition and acid conc.

Krÿlov (A. V.), Smirnova (Mme V. A.), & Tarakanova (Mme G. A.). Влияние физиологически активных веществ на репродукцию вируса Табачной мозаики. [The effect of physiologically active substances on the reproduction of Tobacco mosaic virus.]—Физиол. Раст. [*Fiziol. Rast.*], **7**, 3, pp. 309–314, 1960. [Abs. in *Referat. Zh. Biol., 1961*, 9, Sect. B, p. 5, 1961.]

Dichlorophenoxyacetic acid at 25 mg./l. stimulated the reproduction of TMV [cf. **40**, 126] in middle and lower tobacco leaves, the accumulation of the virus being most intense when the substance was present in the middle leaves. At 28 mg./l. trichlorophenoxyacetic acid stimulated reproduction in middle and young leaves. Pronounced formative changes in the leaves and stems were brought about by heteroauxin. At 200 mg./l. gibberellin sharply stimulated TMV production in young leaves, but there was only mild stimulation in the middle and lower. At 100 mg./l. heteroauxin caused a pronounced reduction in all leaves. While it increases NK metabolic activity in the plant it also erects a barrier for inclusion in the virus NK metabolism.

Ulrychová-Zelinková (Marie). **Effect of some pyrimidine derivatives on the multiplication of Tobacco mosaic virus.**—*Biol. Plant. Acad. Sci. bohemoslov.*, **2**, pp. 240–243, 1960. [Engl. *Chem. Abstr.*, **55**, 7, col. 6603c, 1961.]

Of the 17 further compounds tested in leaf-disk cultures at the Czechoslovak Acad. Sci., Prague [**39**, 348], 2-amino-4-methyl-6-chloropyrimidine exerted the most potent effect, causing 98% inhibition at 500 μg./ml. and 50% at 50 μg., while its

6-hydroxy analogue was approx. 75% as effective. Also toxic at 500 µg. were 2,6-dichloropyrimidine, 2,6-dichloro-4-methylpyrimidine, 2-thio-4,6-dihydroxypyrimidine, 2-4-dichloropyrimidine, 2,4,6-trichloropyrimidine, and 2,6-dichloro-4-trichloromethyl pyrimidine. On the other hand, production of the virus was stimulated by uracil and ethyl *S*-(4-methyl-6-hydroxy-2-pyrimidyl) thioglycolate at 500 µg.

VOGEL (F.). **Über die Wirkung der Beizmittel COBH und COBH + Hg auf die Tabaksaat.** [On the action of the disinfectants COBH and COBH+Hg on Tobacco seed.] —*Tabak-Forsch.* (*Wiss. Beil. Tabak-Z.*), *1960*, 28–29, pp. 117–123, 1960.

The results of laboratory and field experiments are tabulated and described in this report from the Bundesanstalt für Tabakforschung, Forchheim bei Karlsruhe, Germany. In malt agar cultures COBH [**40**, 3]+Hg proved uniformly superior to COBH alone in the elimination of *Alternaria*, *Botrytis*, *Penicillium*, and *Mucor* spp. from Virgin Gold seed. In disinfection tests in soil inoculated with *Thielavia* [*Thielaviopsis*] *basicola* [cf. **40**, 489] more than 10 times as much COBH and over 100 times as much of 2 preparations used for comparison ('J' and C_6Cl_6) were required to produce an effect equal to that of COBH + Hg. Seed treatment with the latter, however, caused heavy reductions in germination which did not follow the use of COBH alone. Subsoil treatment with COBH resulted in good germination and healthy seed, whereas the addition of Hg depressed germination. In seedbed trials on inoculated compost, using Gold B and Hanica (the latter more resistant to *T. basicola*), neither seed nor soil treatment with COBH and COBH+Hg proved as effective as steam sterilization.

KREXNER (R.). **Massnahmen gegen den Blauschimmel des Tabaks im Jahre 1961.** [Measure against blue mould of Tobacco in 1961.]—*Pflanzenarzt*, **14**, 3, pp. 23–24, 1961.

These recommendations [against *Peronospora tabacina*], worked out co-operatively by Austrian tobacco manufacturers, plant protection and agricultural organizations, and tobacco farmers, are being published in 'Der Tabakpflanzer Österreichs'.

KRÖBER (H.). **Untersuchungen über die Blauschimmelkrankheit des Tabaks in Deutschland. I. Die Krankheitserscheinungen.** [Investigations on the blue mould disease of Tobacco in Germany. I. The disease symptoms.]

KRÖBER (H.) & MASSFELLER (D.). **II. Die Wirksamkeit von Fungiziden.** [The effectiveness of fungicides.]

KRÖBER (H.). **III. Ausbreitung der Krankheit im Jahre 1960 und Folgerungen für ihre Bekämpfung.** [Spread of the disease in 1960 and deductions for its control.]

KRÖBER (H.). **Internationale Tagung der Arbeitsgruppe 'Peronospora' der C.O.R.E.S.T.A.** [International session of the *Peronospora* committee of CORESTA.] —*NachrBl. dtsch. PflSchDienst. Stuttgart*, **13**, 3, pp. 41–44, 9 fig.; 4, pp. 49–54, 9 fig.; 5, pp. 69–70, 1 map; pp. 78–79, 1961. [Engl. summ.]

An illustrated description is given from the Inst. für Mykologie, Berlin-Dahlem, of seedbed and field symptoms of *Peronospora tabacina* [**40**, 248], which are stated to differ in some ways from those in America and Australia [**39**, 624; **40**, 247].

In greenhouse experiments infection was prevented on plants sprayed with maneb, polyram, polyram-combi (each 0·05%), zineb preparations (0·1–0·2%), and ferbam > 0·4% or dusted with maneb 24 hr. before heavy inoculation. Dusting with zineb or ferbam gave incomplete control. Maneb, polyram and polyram-combi caused only slight plant injury; the zineb group varied from slightly to severely toxic, and ferbam strongly retarded seedling growth.

The 1960 report of the *Peronospora* Committee of CORESTA, has been noticed [**40**, 490]. Primary and secondary foci of infection are discussed; it is necessary to apply control before the fungus can form conidia, an effort which requires the organized co-operation of all tobacco farmers.

At the session at Milan, 16–17 Feb. 1961, it was pointed out that the recommendation made in 1960 that overwintering of *P. tabacina* be prevented by stopping winter cultivation of tobacco was useless as the pathogen can persist on other hosts. Fungicidal treatment was discussed. The disease has been reported on tobacco in Algeria in March 1961 and elsewhere [cf. below].

Gambogi (P.). **Un attacco di Peronospora tabacina Adam su piantine di Peperone in semenzaio.** [An attack by *P. tabacina* on *Capsicum* in the seed-bed.]—*Agricoltura ital.* 2, pp. 39–41, 2 fig., 1961.

The occurrence of *P. tabacina* [cf. above; **40**, 561] is recorded from Univ. Pisa on capsicum seedlings in the vicinity.

Corbaz (R.). **Le mildiou du Tabac en Suisse. Résultats des premiers essais de lutte.** [Blue mould of Tobacco in Switzerland. Results of first control experiments.] —*Rev. rom. Agric.*, **16**, 12, pp. 101–104, 4 fig., 1960.

This report from the Stations fédérales d'essais agricoles, Lausanne, on *Peronospora tabacina* [**40**, 248] describes the disease and recommends maneb at 0·2–0·3% for control on well-developed plants, or zineb (0·4% liquid form or 7·5% powder).

Cruickshank (I. A. M.) & Rider (N. E.). **Peronospora tabacina in Tobacco: transpiration, growth, and related energy considerations.**

Cruickshank (I. A. M.). **Germination of Peronospora tabacina: effect of temperature.**—*Aust. J. biol. Sci.*, **14**, 1, pp. 45–57, 1 fig., 4 graphs; pp. 58–65, 4 graphs, 1961. [20 & 9 ref.]

At Div. Plant Industry, C.S.I.R.O., Canberra, further studies [cf. **40**, 431] showed that before sporulation the main contribution to the enhanced total daily water loss from diseased plants occurred at night, when the ratio of diseased to healthy plant transpiration approached 2, and that leaf growth was almost zero in the diseased plant from the 3rd day after inoculation, while growth in healthy plants continued at ca. 10%/day. During postsporulation transpiration from diseased tissue decreased to less than that from healthy, the exact ratio being controlled by the environment. Temp. and temp. gradient measurements over healthy and infected leaves at night showed that before sporulation temp. was above that of healthy tissue by 0·1–0·2°, that transport of sensible heat from the air to the leaf surface was less for diseased than healthy tissue by an almost constant amount, and that energy balance considerations adequately accounted for the measured night transpiration from healthy material, but only half the requirement for the diseased tissue. The implications of these phenomena are discussed.

The 2nd paper [cf. **24**, 476] records that some germination occurred after incubation for 1 hr. at 20–30° C. while after 12 hr. there was no significant difference in germination response at 8–27°. Germ-tube growth was initially fastest at 24–27°, but after 12 hr. max. growth had occurred at 15–17·8°. Multispore isolates of the fungus from Canberra and N. Qd could be distinguished from a W. Aust. isolate by differences in percentage germination and germ-tube length after incubation for 5 hr. [cf. **40**, 247]. The significance of the temp. factor in germination and its relationship to the epidemiology of *P. tabacina* under field conditions is briefly discussed.

Dukes (P. D.) & Apple (J. L.). **Chemotaxis of zoospores of Phytophthora parasitica var. nicotianae by plant roots and certain chemical solutions.** —*Phytopathology*, **51**, 3, pp. 195–197, 4 fig., 1961.

At Dept Plant Path., N. Carol. State Coll., Raleigh, zoospores in water suspensions

were attracted to excised roots of resistant and susceptible tobacco vars., also to potato, pepper [*Capsicum*], and eggplant, but not tomato [cf. **40**, 235]. Casamino acid, sucrose, and several other sugars in perforated capillary tubes exerted a strong attraction.

HENDERSON (W. R.) & WINSTEAD (N. N.). **Reaction of Tomato varieties and breeding lines to Fusarium oxysporum f. lycopersici race 1.**—*Plant Dis. Reptr*, **45**, 4, pp. 272–273, 1961.

Of 100 vars. tested at N. Carol. State Coll., Raleigh, for resistance to this race [of *F. bulbigenum* var. *lycopersici*: **30**, 493; **40**, 433], 55 were resistant, 43 susceptible, and 2 segregated for resistance. Of 39 breeding lines, 34 were resistant, 5 susceptible. Each resistant var. or line is considered to possess type A (genotype—Ii or II) as part of its genetic complement.

EDGINGTON (L. V.), CORDEN (M. E.), & DIMOND (A. E.). **The role of pectic substances in chemically induced resistance to Fusarium wilt of Tomato.**—*Phytopathology*, **51**, 3, pp. 179–182, 1 graph, 1961.

The increased susceptibility of Ca-deficient tomato plants to *F. oxysporum* f. [*F. bulbigenum* var.] *lycopersici* and the improved resistance of those treated with α-naphthalene acetic acid (NAA) [**40**, 65] at Conn. agric. Exp. Sta., New Haven, are attributed to changes in the pectic substances in the plant. Stems of Ca-deficient plants contained more water-soluble pectin than normal plants and those treated with 10^{-6} M NAA less. Water-soluble pectins are more readily hydrolysed by pectic enzymes from the wilt fungus.

WOOD (R. K. S.). **Verticillium wilt of Tomatoes—the role of pectic and cellulolytic enzymes.**—*Ann. appl. Biol.*, **49**, 1, pp. 120–139, 1961. [14 ref.]

The author (Imperial Coll., London) describes studies made at Conn. agric. Exp. Sta. to investigate the possibility that pectic and cellulolytic enzymes are produced in the xylem of tomato plants infected by *Verticillium alboatrum* [cf. **39**, 49; **40**, 285]. The evidence obtained showed that an isolate highly pathogenic to tomato secreted polygalacturonase (PG) on various synthetic media. Very active filtrates were obtained from cultures on media containing mineral salts, casamino acids, and pectin or polypectate. Pectates were degraded more rapidly than pectin. No filtrate had high cellulase or pectinesterase activity; the most active were obtained from cultures with carboxymethyl cellulose or pectin as C sources.

V. alboatrum grew poorly in exudates from xylem sap unless C sources were added, in which case culture filtrates had appreciable PG and cellulase activity but little pectinesterase activity. Sap from the susceptible var. Bonny Best and the resistant var. Loran Blood gave similar results. Filtrates from cultures on dead stems of both vars. had little pectinesterase activity and a relatively low PG and cellulase activity.

Extracts from infected plants had no PG or cellulase activity but had a much higher pectinesterase activity on fresh and dry wt. bases. Exudates from the xylem of diseased plants had no PG or cellulase activity but had a low pectinesterase activity, slightly higher than that of exudates from healthy plants. Filtrates with a high PG activity produced some of the symptoms seen on naturally infected plants.

Very weak solutions of pectin, polypectate, and carboxymethyl cellulose caused cuttings to wilt; much higher concs. were required after solutions of these substances had been degraded by PG or cellulase. It is considered that further work on the pectin and cellulolytic enzymes of *V. alboatrum* as agents responsible for some symptoms of disease is justified.

Butler (E. E.). **Transmission of Geotrichum rot of Tomato fruit by Drosophila melanogaster.**—*Phytopathology*, **51**, 4, pp. 250-255, 3 fig., 1961.

At Univ. Calif., Davis, *G. candidum* [**40**, 249] was isolated from *D. melanogaster* collected in tomato fields and other agricultural areas. The flies transmitted the fungus to healthy, wounded tomato fruits in the laboratory. In the field wounded fruits in cheesecloth bags remained healthy while unbagged fruits developed *Geotrichum* rot. Both the amount of rot and the proportion of flies carrying the pathogen increased as the season advanced. The fungus was also isolated from 3 other insect spp., but none of these was observed to visit sound tomatoes.

Koval' (É. Z.). Виды **Rhytisma** на Кленах в Приморье и их специализация. [*Rhytisma* spp. on Maple in Primor'e and their specialization.] -Сообщ. дальневост. Фил. Сибир. Отдел. Акад. Наук СССР [*Soobshch. dal'nevost. Fil. Sibir. Otdel. Akad. Nauk S.S.S.R.*], *1960*, 12, pp. 77–83, 1960. [Abs. in *Referat. Zh. Biol.*, *1961*, 10, Sect. G, p. 76, 1961.]

Results are presented of observations in 1955–57 of *Rhytisma acerinum* [cf. **38**, 629] and *R. punctatum* on maples [*Acer* spp.] in different areas of Primor'e.

Chao (C.-D.) & Tsai (T.-M.). **'Water heartwood' of White Birch in North-East China.**—*For. Sci., Peking, 1958*, 2, pp. 213-222, 1958. [Chin., Russ. summ. *Abstr. Bull. Inst. Pap. Chem.*, **31**, 6, No. 3662, 1961.]

Old and young trees of *Betula platyphylla* are equally susceptible to this condition, which may affect up to 60% of the heartwood in stands on hillsides and an even higher proportion in the lowlands. The pathogens, one of which is *Torula ligniperda*, enter through wounds in the lower trunk, and the existence of the disease is usually seen only after felling in the stumps. Upward spread results in a relative increase of trunk diam. *Pseudomonas* and *Fusarium* spp. have also been isolated from diseased heartwood, but their role, if any, has not yet been determined.

Lohwag (K.). **Poria obliqua (Pers.) Bres. ein interessanter holzzerstörender Pilz.** [*P. obliqua* an interesting wood-destroying fungus.]—*Zbl. ges. Forstw.*, **77**, 1, pp. 52–56, 3 fig., 1960.

A report from the Hochschule für Bodenkultur, Vienna, of the finding of sterile fruit bodies of *P. obliqua* [cf. **40**, 190] in autumn 1958 on a birch near Waidhofen an der Thaya, Austria.

Albuquerque (F. C.). **Mancha parda das fôlhas da castanheira do Pará, causada por uma nova espécie de fungo.** [Brown leaf spot of the Brazil nut tree, caused by a new fungus species.]—*Bol. tec. Inst. agron. Norte* 38, pp. 3–12, 5 pl., 1960. [Engl. summ.]

A leaf spot found on plants of *Bertholletia excelsa* at the Exp. Sta. of the Institute at Belem, though not yet found on wild trees, is described. Small, yellow spots, later with a dark centre and yellow periphery, 5–10 mm. diam., appear on both leaf surfaces and as they multiply give a scorched, reddish-brown appearance to the foliage. The causal organism is described and named *Cercospora bertholletiae* Albuquerque; the spores are 28–64 × 4 μ, conidiophores 12–484 μ.

Biraghi (A.). **L'attuale situazione del 'cancro della corteccia' del Castagno in Italia.** [The actual situation of 'bark canker' of Chestnut in Italy.]—*Schweiz. Z. Forstw.*, **111**, 7, pp. 341–347, 1960. [Germ. summ.]

Reviewing the progress made in the control of *Endothia parasitica* in Italy by the continuous extension in the cultivation of the resistant *Castanea mollissima* [**40**, 251], the author is of the opinion that the pathogen is unlikely to destroy the European forests.

Grente (J.). **Influence de la lumière sur l'expression de la résistance chez les cultures de tissus de Châtaignier.** [Influence of light on the expression of resistance in Chestnut tissue cultures.] —*C.R. Acad. Sci., Paris*, **252**, 16, pp. 2441–2442, 1961.

At the Centre de Recherches agronomiques, Clermont-Ferrand, France, *Phytophthora cinnamomi* [**32**, 106] was grown on cambial tissues of the resistant hybrid *C[astanea] sativa*×*C. crenata* (M. 15) [**39**, 506] and the highly susceptible Saint-Maixent (*C. sativa*), after 50–70 days' growth on Knop's and Heller's media+2–5% glucose and 5 growth factors at 30° C., and maintained in (*a*) continuous darkness, (*b*) continuous light from 3 luminescent tubes 50 cm. apart, or (*c*) darkness for 20–30 days followed by an equal period of light.

The fungus rapidly invaded the tissues of both hosts in (*a*) with subsequent necrosis and also in (*b*), though the development of the pathogen was slower and the differences in reaction between M. 15 and Saint-Maixent were more marked. In (*c*) the calluses of the latter turned brown in 10 days and quickly became necrotic, while the fungus developed on top of the medium, whereas those of the former developed diminutive brown dots, followed by reddening of the surface, with very slight growth of the fungus. After 15 days, tissue growth was resumed and a light-coloured callus formed, showing no sign of inoculation. Mycelium was virtually absent from the surface of the cultures but developed profusely below. Attempts to subculture the tissues formed after the resumption of activity by the fungus were unsuccessful, the latter always gaining the upper hand.

Orian (G.). **Diseases of Filao, Casuarina equisetifolia Forst., in Mauritius.** —*Rev. agric. sucr. Maurice*, **40**, 1, pp. 17–45, 13 fig., 1961. [12 ref.]

Information on these diseases is summarized. 'Smut' disease, caused by *Trichosporium vesiculosum* [cf. **36**, 432] was first reported in 1917, but subsequent observations showed it to be a secondary pathogen following *Pseudomonas solanacearum* [**31**, 537; **32**, 614] the true cause of wilt; a detailed account of inoculation studies is presented. *Armillaria* rot (*A. mellea*) and attack by *Phytophthora cambivora* have also been reported [**31**, 537]; minor diseases include scaly bark, bark-cracking, bark-splitting, and witches' broom, which are described, but the causes are not yet known. A black spotting of the seed is associated with *Pestalotiopsis* sp.

Penfold (A. R.) & Willis (J. L.). **The Eucalypts. Botany, cultivation, chemistry, and utilization.**—xx–551 pp., 61 pl. (1 col.), 28 fig., 5 maps, London, Leonard Hill [Books] Ltd. New York, Interscience Publishers, Inc., 1961. 80*s*. [17½ pp. ref.]

Chapt. 9 'Pests and parasites' (pp. 175–189) of this well-produced addition to the 'World Crops' series, from the Mus. applied Arts Sci., Sydney, deals with the fungi on eucalypts [cf. **38**, 38]. An account is given of fungi of the nursery [**39**, 628] and wood rot of living trees, brown and white rots being dealt with separately and steps for their prevention indicated. Of the fungi causing brown rots mention is made of *Polyporus eucalyptorum* responsible for 'white punk' and 'brown heart rot', and of *Fistulina hepatica*, associated with several types of rot [cf. **17**, 147]. The causal agents of white rots include *Armillaria mellea* [**40**, 492], *Fomes* sp. [cf. **17**, 148], and *Polystictus versicolor*, perhaps the most destructive of all. Other sections deal with timber-staining fungi, decay of seasoned timber, wood preservation, and possible biotic control of fungi.

Wilson (C. L.). **Study of the growth of Ceratocystis fagacearum in Oak wood with the use of autoradiograms.**—*Phytopathology*, **51**, 4, pp. 210–215, 12 fig., 1961. [14 ref.]

At Dept Plant Path., Univ. Ark., the growth of *C. fagacearum* in sapwood blocks

from naturally infected and inoculated oaks (mostly *Quercus marilandica*) and in inoculated blocks was traced by means of autoradiograms and staining. Cultures used to inoculate standing trees were grown for 27 days on a medium containing radioactive S_{35}; 11 days after inoculation blocks for sectioning were removed from the infected area. At least 10 days' exposure of the sections to sensitive film was necessary, whereas with inoculated blocks only 4 days' exposure was required. Sections could be stained before enveloping them in the emulsion. The fungus grew primarily in the parenchyma of the medullary rays, uniseriate rays, and xylem. Walls were usually penetrated through pits, and the middle lamellae were extensively invaded. Diffusates containing S from fungal hyphae were active on starch grains and the middle lamella. The medium giving the best results, 1·25 millicuries S_{35}/50 ml., inhibited growth and sporulation and was mutagenic, an albino str. and one with abundant aerial mycelium being obtained.

Shemyakin (I. Ya.). Некоторые новые данные к характеристике ложного трутовика Дуба и вызываемой им гнили. [Some new data on the characters of the tinder fungus of Oak and the rot caused.]—Труд. Воронеж. гос. Заповед. [*Trud. Voronezh. gos. Zapoved.*], *1959*, 8, pp. 287–293, 1959. [Abs. in *Referat. Zh. Biol., 1961*, 10, Sect. G, p. 76, 1961.]

Studies from 1932–57 in the Voronezh and neighbouring districts showed that infection by *Fomes robustus* [cf. **39**, 248] was highest in the II (47%) and III (28%) oak age groups. Rot foci were usually situated in the bole and trunk. In old trees the heavy brushwood of the crown is infected. In the majority of the trees (82%) there appeared to be a single focus of infection, but multiple foci were found in mature plantations. Infection occurs through dead brushwood, lateral shoots, and bark and trunk wounds. The annual spread of the rot is 2–32 cm. in length and 0·3–1·4 cm. laterally. It develops more quickly in wood with large vessels and broad medullary rays. From initial infection to fruitbody production is 3–9 yr., depending on the thickness of the trunk and age at infection. The sporophores and the effect of external conditions (humidity, isolation, temp.) on growth are described.

Phillips (A. M.), Large (J. R.), & Cole (J. R.). **Insects and diseases of the Pecan in Florida.**—*Bull. Fla agric. Exp. Sta.* 619, 84 pp., 70 fig., 1960.

A revision of Bull. 499 [cf. **34**, 497, 759].

Leontovyč (R.). **Príspevok k poznaniu Dothichiza populea Sacc. et Briard na Slovensku I. Rozšírenie a vývojové cykly so symptomatikou.** [Contribution to the knowledge of *D. populea* in Slovakia I. Distribution and developmental cycles with symptomatics.]—*Ved. Práce výsk. Úst. les. Hosp., Banská Štiavnica, 1960*, 1, pp. 231–256, 12 fig., 3 maps, 1960. [Russ., Germ. summ.]

An account from the Res. Inst. Silviculture, Banská Štiavnica, of the studies of *D. populea* [map 344] on poplar, in particular in the Žitný ostrov near Bratislava. Special attention is given to nurseries and stands as foci of infection. Spring infection, from early spring until past budding, and autumn infection, at leaf fall, were caused by both the imperfect and the perfect state (*Cenangium populneum*) [*Encoelia fascicularis*: cf. **37**, 188]; summer infections, approx. from 20 June to 20 July, bore only conidia. The exact times of incidence depended on rain and mist, the most dangerous periods being after weather injuries.

Bakshi (B. K.) & Singh (B.). **Heart-rot and decay due to Polyporus palustris.**—*Indian For.*, **87**, 2, pp. 116–118, 2 pl., 1961.

P. palustris [**33**, 695], causing brown heart rot in *Cassia nodosa* and a cubical rot of industrial timber, is reported by Forest Res. Inst., Dehra Dun, India, to occur

in hardwoods also and to damage creosote-treated poles of sal (*Shorea robusta*) and chir (*Pinus roxburghii*); it was also determined to be a wound parasite of *C. nodosa*. Sporophores found for the 1st time in India and obtained in agar culture are described. The fungus is heterothallic and bipolar.

Cafley (J. D.) & Huntly (J. H.). **Control of the Cedar-Apple rust on Red Cedar.** —*Bi-m. Progr. Rep. Dep. For. Can.*, **17**, 2, p. 1, 1961.

Heavy infection by *Gymnosporangium juniperi-virginianae* [cf. **39**, 508; **40**, 332] on *Juniperus virginiana* was controlled by a spring spray of 100 p.p.m. actidione in water with detergent soap as emulsifier. Slight foliage burn disappeared by autumn and the trees were still healthy after 2 yr.

Yde-Andersen (A.). **Om angreb af Polyporus schweinitzii Fr. i nåletraebevoksninger.** [On infection by *P. schweinitzii* in conifer plantations.]—*Dansk Skovføren. Tidsskr.*, **46**, pp. 26–38, 4 fig., 1961.

Although more serious in some respects than *Armillaria mellea* and *Fomes annosus*, *P. schweinitzii* has hitherto been little regarded in Denmark. Information is consequently presented on its life-history, geographical distribution, and symptomatology. During a study in 1959–60 infection was found in 4 localities, mostly on larch, spruce, and Douglas fir [*Pseudotsuga taxifolia*] planted between 1885–6 and 1935, while attacks on *Thuja* and *Chamaecyparis* spp. (1 each) were also recorded. Infection may be recognized at the time of the 1st thinning partly by root and heart rot and partly by storm damage in the affected plantings. Cartwright and Findlay have pointed out [**38**, 344] that *Polyporus schweinitzii* can survive in timber prepared from diseased trees, necessitating either rejection or kiln-drying before use.

Jamalainen (E. A.). **Havupuiden taimistojen talvituhosienivauriot ja niiden kemiallinen torjunta.** [Damage by low temperature parasitic fungi in coniferous nurseries and its chemical control.]—Reprinted from *Silva fenn.* 108, 15 pp., 3 fig., 1961. [Engl. summ.]

Studies since 1954 at the Agric. Res. Centre, Tikkurila, Finland, have shown that *Herpotrichia nigra* [**36**, 7] is the principal cause of damage to young spruce, initial symptoms appearing in early spring in the form of a thready mass of dark greyish-brown mycelium covering the plant, followed by needle-cast. *Phacidium infestans* [cf. **39**, 250] is the most serious low-temp. parasitic fungus in pine nurseries, infected seedlings showing a distinctive reddish-brown colour in spring, due to the destruction of the chlorophyll in the needles. In spring 1958 numerous samples of *Botrytis cinerea* [cf. **38**, 428] were obtained from 1–2-yr.-old pine and spruce seedlings from many parts of Finland.

Inoculations with *B. cinerea* and *H. nigra* disclosed different temp. requirements. At —1 to 1 and 7 to 10° C. *B. cinerea* failed to infect 2-yr.-old pines but did infect 50% 1-yr.-old, also 20% 2-yr.-old spruce and 70–80% 1-yr.-old. *B. cinerea* developed much better at 18–22°, causing 100% infection in 1-yr.-old pine and spruce, 70% in 2-yr.-old spruce, and 30% of pine.

Chemical control trials in 1954–57 and 1958–59 showed that 20% quintozene at 250 g./are was effective, but zineb less so. Two methods are recommended: either dusting with 20% quintozene at 250–500 g./are or spraying with 50% at 100–200 g./are.

Parker (A. K.) & Long (J. R.). **Botrytis sp. associated with damage to Douglas Fir nursery stock.**—*Bi-m. Progr. Rep. Dep. For. Can.*, **17**, 2, p. 4, 1961.

At the Duncan nursery, Vancouver Island, Douglas fir [*Pseudotsuga menziesii*] seedlings affected by dieback developed twisted, flaccid shoots and yellow leaves

that fell or turned brown and remained attached. Damage was 3–13 and mortality $< 0{\cdot}5$–1%. Conidia of a *B.* sp. were abundant on affected leaves, and the fungus was isolated. Dense stands and heavy rainfall had apparently favoured infection.

Molnar (A. C.), Wallis (G. W.), & McMinn (R. G.). **Survey of Poria rot in second-growth Douglas Fir stands.**—*Bi-m. Progr. Rep. Dep. For. Can.*, **17**, 2, pp. 3–4, 1961.

Preliminary results from the Cowichan Lake District indicated that *P. weirii* [cf. **39**, 740], or a str. of it, can cause large openings in 50- to 60-yr.-old *Pseudotsuga menziesii* stands on both high quality and poorer sites. Av. size of infected trees was less than that of healthy, gradual death of the roots causing loss of annual increment. Damage may become more severe in older stands on the poorer sites.

Lohwag (K.). **Coleosporium an Pinus brutia Ten.** [*Coleosporium* on *P. brutia.*]—*Orman Fak. Dergisi*, Ser. A, **10**, 1, pp. 24–26, 2 fig., 1960.

In 1959 at the Göcek Afforestation Area, Fethiye Forest Admin., Turkey, heavy infection by *Peridermium pini* f. *acicola*, occurred on the 1–2-yr.-old needles of young pines. The alternate host was not found, nor could inoculations be made. For control attention should be paid to resistant plants for seed [cf. **38**, 551].

Richards (B. N.). **Soil pH and mycorrhiza development in Pinus.**—*Nature, Lond.*, **190**, 4770, pp. 105–106, 1961.

In pot experiments at the For. Res. Sta., Beerwah, Qd, seedlings of *P. taeda* developed lime-induced chlorosis at pH 7·5 and had few mycorrhiza, but the addition of the Fe salt of ethylene diamine tetra-acetic acid enabled normal mycorrhiza to develop without lowering the pH. Development in *P. caribaea* was reduced by NH_4NO_3 and $CaCO_3$, an increase in NO_3 causing a reduction regardless of changes in pH. Mycorrhizal development in *P. taeda* was greatly reduced by NH_4NO_3 and $NaNO_3$ but was unaffected by Na_2CO_3, even though the soil pH was raised to 7·4. The Na ions increased the soil pH but did not affect mycorrhiza, which was, however, greatly decreased by NO_3.

It is concluded that the formation of mycorrhiza in *P. taeda* and *P. caribaea* is not inhibited by neutral or slightly alkaline soil reaction, provided the NO_3 level is low.

Snow (G. A.). **Artificial inoculation of Longleaf Pine with Scirrhia acicola.**—*Phytopathology*, **51**, 3, pp. 186–188, 6 fig., 1961.

At the Forest Disease Lab., Gulfport, Miss., *S. acicola* [**38**, 721] from loblolly (*Pinus taeda*) and longleaf pines (*P. palustris*) infected longleaf but not loblolly when 2-yr. potted plants were sprayed with conidial suspensions and then placed in humidity chambers for 128 hr. Infection occurred only on immature needles 3–6 in. long, and 8–11 weeks elapsed before symptoms appeared. Cultural characters varied widely among 126 isolates but were not correlated with % infection or symptom type; isolates from longleaf were generally the most infective.

Ferrell (W. K.), Johnson (F. D.), & Michelsen (C. E.). **Movement and distribution of radiophosphorus in crowns of healthy and pole blighted Western White Pines (Pinus monticola D. Don.).**—*Plant Physiol.*, **35**, 4, pp. 413–417, 5 graphs, 1960.

In field studies at Univ. Idaho, accumulations of P_{32} after injection into pole-size *P. monticola* trees were largest (on the basis of activity/g. leaf tissue) in the upper crowns of healthy trees and the lower crowns of those with pole blight [cf. **38**, 104]. Taking the tree as a whole, P_{32} movement was much more rapid in those with pole blight, but it was slower in the blighted, severed, extreme tops, which had yellowed leaves and reduced growth.

Powers (H. R.) & Boyce (J. S.). **Fomes annosus on Slash Pine in the Southeast.** —*Plant Dis. Reptr*, **45**, 4, pp. 306–307, 1 map, 1961.

Surveys by the S.E. Forest Exp. Sta., Asheville, N. Carol., indicated that this fungus [**33**, 512], which killed slash pines (*Pinus elliottii*) in 73% of thinned plantations in Fla., Ga., and S. Carol., also occurred but did less damage in a high proportion of thinned natural stands, and did very little damage in unthinned stands.

Král' (V.). **K otázke účinku predsiatbového morenia agronalom na klíčivost' semena Borovice Sosny-Pinus silvestris L.** [On the effect of pre-sowing agronal treatment on seed germination in Scots Pine.]—*Ved. Práce výsk. Úst. les. Hosp., Banská Štiavnica, 1960*, 1, pp. 23–35, 1960. [Russ., Germ. summ.]

At the Res. Inst. Silviculture, Banská Štiavnica, Czechoslovakia, pine seed samples from 12 localities, prepared in conformity with the standards ČSN 482111 and ČSN 481211 in sterile conditions, were shaken in glasses with agronal at 0·4, 0·5, 0·6, and 0·7% seed wt. until the agronal covered the seed entirely. Energy and capacity of germination assessed, respectively, after 5 and 21 days at 24° C. and R.H. ~ 70%, varied widely with the locality; in general germination was best with 0·6% agronal.

Čech (M.), Králík (O.), & Blattný (C.). **Rod-shaped particles associated with virosis of Spruce.** *Phytopathology*, **51**, 3, pp. 183–185, 4 fig., 1 graph, 1961.

At the Biol. Inst. Czechoslovak Acad. Sci., Prague, particles 200–3,000 (av. 625) × 49 ± 3 mμ were found in de-resined exudates from woody twigs of both naturally infected and aphid-inoculated spruce [**37**, 123; **40**, 270] but not of healthy trees.

Moreau (R.) & Shaeffer (R.). **Sur la maladie du rond dans les Pessières jurassiennes.** [On ring disease in the Spruce plantings of the Jura.]—*Ann. sci. Univ., Besançon*, Sér. 2, 3 (*1959*), pp. 112–120, 1960.

The completed results of studies on the infection of spruce by *Fomes annosus* [**40**, 253] confirmed Rishbeth's findings on the biology of the fungus [**39**, 251; **40**, 190]. Antagonism between *F. annosus* and *Trichoderma viride* and the influence of temp. upon this were verified under natural conditions. In its composition and activity the microflora appeared to correspond with the type of soil [cf. **40**, 496] or to reflect exactly the condition of the rhizospheres. In practice, the forest humus should not be allowed to become alkaline, though acidification is always to be feared in soils inadequately supplied with bases.

Yde-Andersen (A.). **Om den årstidsbetingede variation i hyppipheden af stødfladeinfektion med luftbårne Fomes annosus-sporer hos Rödgran.** [On the seasonal variation in the frequency of stump surface infection by air-borne *F. annosus* spores on Norway Spruce.] *Dansk Skorforen. Tidsskr.*, **46**, pp. 139–158, 1 graph, 1961. [Engl. summ.]

A further tabulated survey is presented of studies from Nov. 1959 to Oct. 1960 in the Løvenholm Forest area of Denmark [**40**, 497] to determine whether stump surface infection by air-borne spores of *F. annosus* occurs [**30**, 295] and is seasonal.

In a 19-yr.-old stand on former arable land 150 trees were felled every month; disks 2 cm. thick from each stump were incubated in wet newsprint for 10 days at ±20° C. and then examined for infection. Some 3 months after felling disks were again cut from each stump free from infection. From the stumps yielding *F. annosus* at the 2nd examination a disk was removed near ground-level to ascertain whether infection might have spread upwards from the roots.

The results of the investigation showed that stump surface infection by air-borne spores may develop within a month of felling. Moreover, a degree of relationship appears to exist between the amount of stump infection in a thinning and (*a*) the

mean temp. in the month of felling and (*b*) the amount of rainfall 28–14 days before the operation. On the basis of these observations the author recommends thinning during Jan.–Mar., when the risk of infection is very slight.

Pelhate (J.) & Barbotin (F.). **Le dépérissement des Thuyas et la maladie des taches foliaires dans l'Ouest.** [Wilt and leaf spot disease of *Thuja* spp. in the West.]—*Phytoma*, **11**, 104, pp. 22–24, 3 fig., 1959. [Received May 1961.]

In 1956 typical symptoms of *Didymascella thujina* [**33**, 523] infection were found on *T. gigantea* in the department of Ille-et-Vilaine [Brittany]. The disease is now thought to be widespread in W. France, where it has been found in Calvados (Normandy) and several parts of Brittany. Heavy losses are caused in nurseries to plants 3–4 yr. old. Plantings should be well aerated and not screened with *Thuja* spp. Seed treatment is recommended, also spray applications of Bordeaux mixture, but the development of resistant vars. offers the best hope of control.

Lohwag (K.). **Holzfäulen an Pappelholz.** [Wood rot of Poplar wood.] –*Orman Fak. Dergisi*, Ser. A, **9**, 1, pp. 1–6, 4 fig., 1959.

Details are given of the most important fungal infections, including *Fomes igniarius* [cf. **38**, 629], on timber and on the living tree. Most serious and frequent on timber stored near the Forestry Fac., Büyükdere, Turkey, were *Polystictus hirsutus*, *Stereum purpureum* [**39**, 52], and *Schizophyllum commune* [cf. **38**, 338]. Secondary infection can be controlled by painting or spraying felled timber with a wood protective in the forest.

Rothrock (C. W.), Smith (W. R.), & Lindgren (R. M.). **The effects of outside storage on Slash Pine chips in the south.**—*T.A.P.P.I.*, **44**, 1, pp. 65–73, 2 diag., 4 graphs, 1961.

In view of the potential advantages of outside storage a test pile containing 106 units of slash pine chips was constructed at Fargo, Ga, in June 1959, and sampled monthly for moisture and sp. gr. determinations, identification of decay-producing organisms, and suitability for pulping.

Temps. within the pile increased by as much as 60° F. during the 1st weeks and remained above ambient levels. A drying cycle within the pile was followed by a rise in moisture to an abnormal level. Dark staining of the chips associated with an *Alternaria*-like fungus began to develop after 2 months and was prevalent in about ½ the chips after 4. Fungi of this type tend to penetrate and form large cavities within the secondary walls of fibres or tracheids, in contrast to the characteristic action of wood-decaying Basidiomycetes, which bore holes directly into the walls or cause a general thinning of the fibre structure. The presence of spp. of the latter group was suspected but could not be verified owing to the interference of the dark stain. Towards the close of the storage period an increasing number of chips showed a brown discoloration associated with a hyaline fungus discernible only by microscopic examination. A greenish mould or light stain appearing after 1 month's storage was attributed to a *Gliocladium* sp. Organisms of this type seem to subsist on material leached out of the wood and do not attack the cell walls; they have, in fact, been observed to inhibit the establishment of rotting fungi. Extensive infections commenced from the outer 1–2 ft. of the pile and by 5 months had spread several ft. towards the interior, but the centre was still largely unaffected.

Sp. gr. losses due to fungi amounted to 1–1·5%/month, no larger than those occurring on roundwood. Loss in pulp tear strength was also comparable to the figure for roundwood, amounting to some 5%/month. The results of the investigation are considered to indicate that outside storage of chips in the S. of U.S.A. is practicable [cf. **40**, 134].

NIKAI (S.). **Causes and prevention of mildew on Bamboo wares. XII. Impregnating Na pentachlorophenolate into Bamboo stems under pressure.—1, 2.**—*Hakkô Kogaku Zasshi*, **38**, pp. 131–137, 1960. [*Chem. Abstr.*, **55**, 10, col. 9761 g, 1961.]

In further studies [**40**, 135] *Alternaria tenuis* and related spp. showed the highest degree of resistance to Na pentachlorophenate, the min. conc. of which inhibiting germination was 4:1,000. In a spore suspension spray test *Penicillium citrinum* was the most resistant, requiring a min. of 7:1000. Drying bamboo stems for 30 min. at 95° C. under reduced pressure, followed by 5 min. treatment with Na pentachlorophenolate solution at 5 kg./sq. cm., permitted 3·5–4·8 times as much penetration into the stem as 100 min. under atm. pressure and effectively prevented mildew.

In part 2 (with S. KANDO) it is reported that drying at 95° and 50 mm. for 1 hr. left 4·9% moisture content. Subsequent treatment under reduced pressure with Na pentachlorophenolate, followed by keeping for 15 min. at 5 kg./sq. cm., resulted in complete penetration.

CRÜGER (G.). **Die Praxis der Beizung von Gemüsesaatgut.** [Practices in vegetable seed treatment.]—*Rhein. Mschr. Obstb., 1961*, 3–4, 2 pp., 1961.

This note from Inst. für Gemüsekrankheiten und Unkrautforschung der biol. Bundesanstalt, Germany, lists the diseases of various vegetables, seed transmission of which is controlled by captan, quinoxime-benzyolhydrazone, and thiram, and those which need hot water treatment or mercurials. The effect of these treatments (singly and in some combinations) on germination is noted and their applicability to particular vegetables discussed.

PREND (J.) & JOHN (C. A.). **Method of isolation of Erwinia tracheiphila and an improved inoculation technique.**—*Phytopathology*, **51**, 4, pp. 255–258, 2 fig., 1961.

In an isolation method [cf. **39**, 529] devised at the Crop Res. Dept H. J. Heinz Co., Pittsburgh, Pa, a hypodermic needle injected sterile water into the petiole of a wilted cucumber leaf, then withdrew the fluid and transferred it to a culture plate. Alternatively an inoculating loop was drawn across the surface of a petiole sliced longitudinally, and then streaked on agar.

A multi-needle inoculating pad, made by inserting 25–30 headless pins into a padded rubber stopper, dipped in a culture suspension and pricked through a cotyledon, gave better results than the leaf-rub inoculation method at 2 levels of temp. and R.H.

SCHMIDT (TRUDE). **Die Kohlenperonospora richtig bekämpfen.** [The Cabbage *Peronospora* properly controlled.]—*Pflanzenarzt*, **13**, 12, pp. 120–121, 1 fig., 1960.

Of several fungicides tested at the Bundesanstalt für Pflanzenschutz, Vienna, against *P. brassicae* [*P. parasitica*: **39**, 514] on cabbage a Cu spray was the most effective, but careful cultivation of the seedlings is also important. Measures recommended include soil disinfection, control of R.H., and weekly spraying as soon as the cotyledons unfold.

WIGGELL (P.), HAWKEN (R. H.), WIGGELL (D.), COCK (L. J.), & BANT (J. H.). **Field trials on the control of club root in Brassicae.**—*Ann. appl. Biol.*, **49**, 1, pp. 110–119, 1961.

In tests by the N.A.A.S., Exeter and Leeds, in 1957–9 *Plasmodiophora brassicae* [cf. **39**, 513] on winter and summer cauliflowers, Brussels sprouts, summer cabbages, and savoys in naturally and uniformly infected plots in Devon and Lancs. receiving ordinary commercial manurial treatments was best controlled by pure (100%)

calomel suspension at 1 and 2 oz./pint, the seedlings being given no fungicidal treatment in the seedbed but treated immediately before planting or in their final position. Calomel paste (3 lb. of 4% dust in 1 pint water) was effective, but the treated plants were checked and became retarded for a time [cf. **40**, 5]. Formulations of quintozene, aldrin, and metham-sodium failed to give satisfactory control.

Pelhate (J.) & Barbotin (F.). **La pourriture bactérienne du Chou fourrager dans l'Ouest.** [Bacterial rot of Kale in the West.]—*Phytoma*, **11**, 104, pp. 19–21, 2 fig., 1959. [Received May 1961.]

In 1958 an outbreak of *Erwinia phytophthora* in the department of Ille-et-Vilaine [Brittany] on various hosts, including kale, the symptoms on which are fully described, was studied at l'École Nationale d'Agriculture and la Station d'Avertissements Agricoles, Rennes, France. Marrow-stem kale ('chou Moellier' and 'chou Demi-Moellier') proved highly susceptible, infection being up to 90% at the end of Aug., though on 'chou Branchu' it did not exceed 15% and on 'chou de Toussaint' (Cavalier type) it was up to 30%.

Control is recommended by careful rotations, the avoidance of a micro-climate favourable to the parasite, and sowing thickly in straight lines without transplanting, which obviates the removal of leaves.

Osnitskaya (Mme E. A.). Влияние бактериальных удобрений на вредоносность килы. [The effect of bacterial fertilizers on the severity of club root.]—*Ex* Сборн. н.-т. Информ. воздел. Овощн. Культур [*Sborn. n.-i. Inform. vozdel. Ovoshchn. Kul'tur*], pp. 36–39, 1960. [Abs. in *Referat. Zh. Biol., 1961*, 5, Sect. G, p. 77, 1961.]

Var. no. 1 cabbage seedlings in the 1st leaf stage were thinned out into peat-nutrient blocks free from *Plasmodiophora brassicae* [**40**, 72], with or without the addition of azotobacterin and phosphorobacterin. A month later the seedlings were transplanted to plots heavily infested by *P. brassicae*, bacterial fertilizer being introduced under some of those which had not been given it in the blocks. Bacterization did not inhibit club root development and produced a positive effect in infested soil only if applied at transplanting to seedlings in uninfected peat.

Błaszczak (W.). **Badania morfologiczno-fizjologiczne 9 szczepów Rhizoctonia solani Kuehn z Brukwi.** [Morphological and physiological investigations on 9 *Corticium solani* strs. from Swede.]—*Prace Kom. Nauk roln. leśn., Poznań*, **5**, 8, 29 pp., 12 fig., 1959. [Engl. summ.]

The strs. (in culture) are described. Rb 19, inoculated on swede root caused a rot, the extent of which varied with temp. In pathogenicity tests on swede and colerape [? kohlrabi] seedlings in the greenhouse the strs., except those from potato, were severely damaging.

Narkiewicz-Jodko (J.). **Wstępne badania nad wpływem terminu siewu i otaczającego środowiska na rozprzestrzenienie się chorób wirusowych Buraków.** [Preliminary studies on the effect of sowing time and ambient conditions on the spread of virus diseases of Beet.]—*Prace Inst. Ochr. Rośl., Poznań*, **1**, 3, pp. 75–93, 1959. [Abs. in *Referat. Zh. Biol., 1961*, 8, Sect. G, p. 78, 1961.]

A survey in 1957 of 142 sugar beet fields in the Kostyanskiĭ region of Poland showed that beet yellows was most widespread, then beet mosaic [cf. **37**, 157], and lastly beet leaf curl [**40**, 501]. There was complex virus infection in a large percentage of the plants. Insects were most prevalent in early sowings, which were also the most severely infected. Beet sown at the end of Apr. gave 100% less yield than that sown in May and the leaves were not suitable for silage. Virus infection was higher on light than on heavy soils.

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